Group Award Specification for:

HNC in Chemical Process Technology at SCQF level 7

Group Award Code: GL6A 15

HND in Chemical Process Technology at SCQF level 8

Group Award Code: GL6C 16

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Contents

1 Introduction

This document was previously known as the Arrangements document. The purpose of this document is to:

- assist centres to implement, deliver and manage the qualification
- provide a guide for new staff involved in offering the qualification
- inform course managers, teaching staff, assessors, learners, employers and HEIs of the aims and purpose of the qualification
- provide details of the range of learners the qualification is suitable for and progression opportunities

This is the Group Award Specification for the HNC in Chemical Process Technology and HND in Chemical Process Technology.

The HNC/HND in Chemical Process Technology Group Awards allow learners to gain skills and knowledge in Chemical Engineering, Chemical Processing and Chemistry and the essential skills necessary for further articulation to HND or degree programmes in relevant subject areas.

Qualifications Design Teams (QDT) were created to support the development process in consultation with employers and higher education colleagues and further education partners. In designing the Group Awards, the QDT has been fully aware of the need for the Group Awards to contain relevant technical and transferable skills to enable immediate entry to employment while at the same time allowing articulation to degree courses. The QDT believes that an appropriate balance between academic and vocational knowledge and skills has been achieved throughout the mix of Unit content and potential teaching approaches.

The Group Awards are designed for both full and part-time learners and the target audience is those who wish to progress to further study or to take up a career in the chemicals sector or as process technicians in a range of industrial sectors.

The theoretical content may be delivered by open and distance learning methods, provided that adequate preparations are made. Additional planning and resources will be needed for learner support and assessment. Quality assurance procedures must also be sufficient and robust to support open and distance learning.

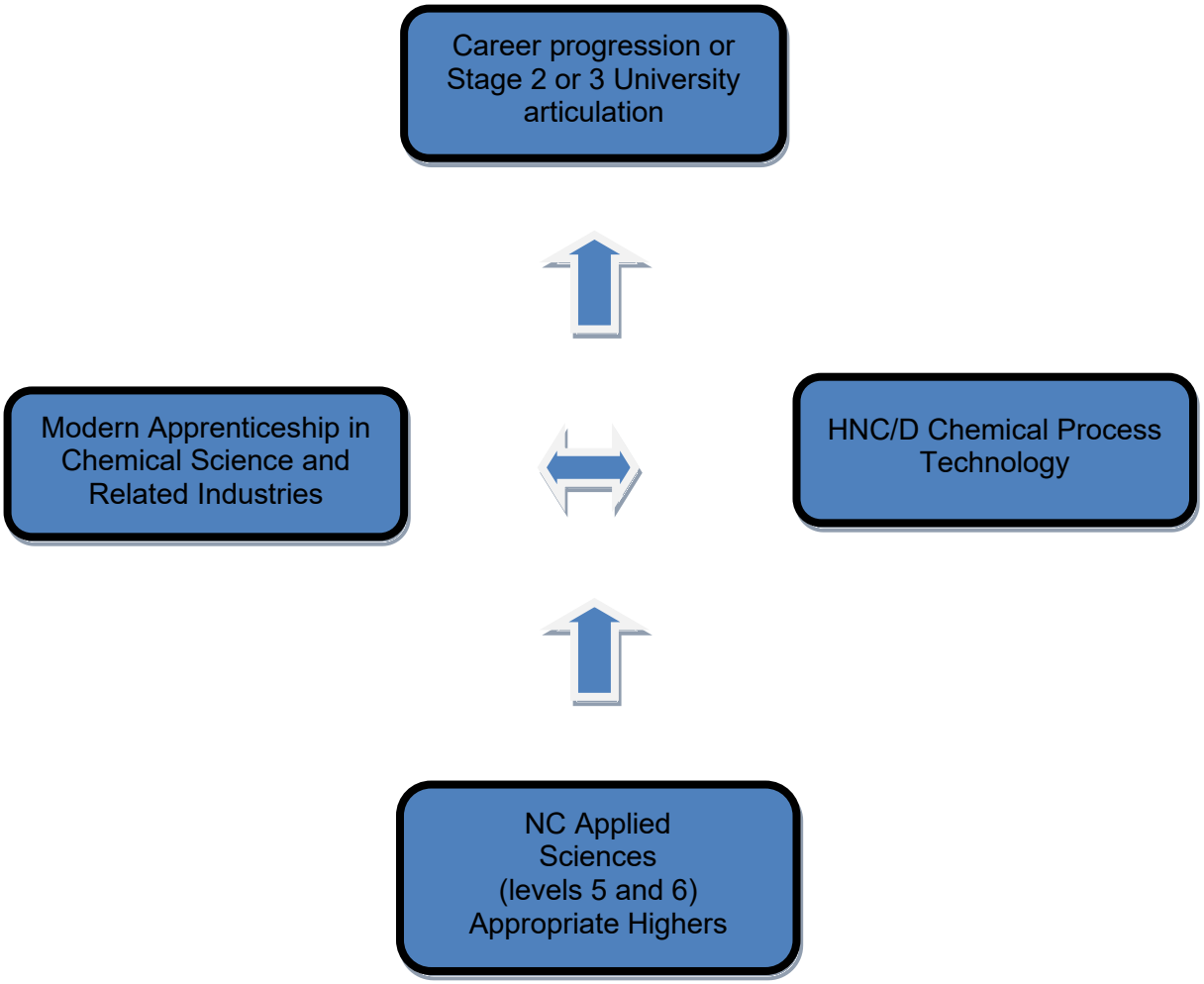
The Group Awards are designed as discrete, specialised qualifications to equip learners with the knowledge, skills and understanding required for employment or progression to further academic study and may be seen to be supporting the national strategies and drivers as outlined below.

A range of industrial sectors require skilled process technicians and chemical engineers. These industries are not only chemical sector companies, but also life sciences companies, food and drink companies and industrial biotechnology companies. These Group Awards are designed to need the needs of these industries.

The Wood Commission Report emphasised that 'moving beyond school, we must ensure that young people at college pursue studies with an expectation that they will lead successfully to employment in the prevailing labour market. The newly formed regional colleges, through more focused and ambitious outcome agreements, and working closely with industry, should ensure that a college education provides skills and qualifications relevant to the market requirements and in particular the new challenges of the modern technology orientated economy.' And that 'As they move into the senior phase, young people of all abilities should have the opportunity to follow industry relevant vocational pathways alongside academic studies.'

The current review has allowed the Group Awards to take into account changes that have taken place with the introduction of Curriculum for Excellence, inclusion of updated technical data, revised assessment strategies, flexibility to meet the needs of industry and recognition of the needs of learners for progression to higher education.

The interrelationship of these Group Awards with other qualifications is illustrated by the following diagram:



2 Qualification structure

HNC in Chemical Process Technology

Mandatory Units (6 credits)

Code		Unit title	SCQF level	SCQF credit points	SQA credit
H92X	34	Fundamental Chemistry: Theory and Laboratory Skills	7	16	2
H933	34	Organic Chemistry: Theory and Laboratory Skills	7	8	1
H936	34	Physical Chemistry: Theory and Laboratory Skills	7	8	1
HF0K	34	Chemical Process Technology: Graded Unit 1	7	8	1
H97N	34	Chemical Engineering: Principles	7	8	1

Mandatory Units (2-3 credits)

Code		Unit title	SCQF level	SCQF credit points	SQA credit
HE3F	34	Process Safety Engineering	7	8	1
H97T	34	Heat Transfer Theory and Practical Skills	7	8	1
HE3E	34	Fluid Mechanics: Theory and Laboratory Skills	7	8	1

Mandatory Units (1-2 credits)

Code		Unit title	SCQF level	SCQF credit points	SQA credit
H7K0	33	Engineering Mathematics 1	6	8	1
H7K1	34	Engineering Mathematics 2	7	8	1

Optional Section A (0–3 credits)

Code		Unit title	SCQF level	SCQF credit points	SQA credit
HE3G	34	Industrial Chemicals: Processes and Products	7	8	1
H93H	34	Physics Principles: Mechanics	7	8	1
H93G	34	Physics Principles: Heat and Thermodynamics	7	8	1
DF82	34	Quality and Health & Safety Systems in Science Industries	7	8	1
H92W	33	Fundamental Chemistry: An Introduction	6	8	1
J5R2*	35	Instrumental Techniques 1	8	8	1
H7K2	34	Engineering Mathematics 3	7	8	1
D75X	34	Information Technology: Applications Software 1	7	8	1
H92Y	34	Inorganic Chemistry: Theory and Laboratory Skills	7	8	1
H91V	34	Laboratory Skills for Science Industries	7	16	2
H97P	34	Industrial Biotechnology: Processing	7	8	1
H97L*	34	Chemical Engineering: Applied Physical Chemistry	7	8	1

Optional Section B — Broadening Units (0–1 credit)

Code		Unit title	SCQF level	SCQF credit points	SQA credit
H8T2	33	Workplace Communication in English	6	8	1
DE3R	34	Personal Development Planning	7	8	1

*Refer to History of Changes for revision changes.

This Group Award is made up of 12 SQA Unit credits and comprises of 96 SCQF credit points. A minimum of 72 SCQF credit points are required to be achieved from the mandatory sections. Learners then select optional Units from the remaining sections to complete the total of 96 SCQF credit points. Depending on the SCQF credit points achieved from the mandatory sections, a further 8–24 SCQF credit points are required from the optional Sections A–B.The *Chemical Process Technology: Graded Unit 1* is an investigative report. The purpose of the *Chemical Process Technology: Graded Unit 1* is to assess the learner's ability to integrate and apply the knowledge and skills gained in the individual Units to demonstrate that they have achieved the specific aims of the Group Award and to grade learner achievement HND in Chemical Process Technology

Mandatory Units (20 credits)

Code		Unit title	SCQF level	SCQF credit points	SQA credit
H92X	34	Fundamental Chemistry: Theory and Laboratory Skills	7	16	2
H933	34	Organic Chemistry: Theory and Laboratory Skills	7	8	1
H936	34	Physical Chemistry: Theory and Laboratory Skills	7	8	1
HF0K	34	Chemical Process Technology: Graded Unit 1	7	8	1
H97N	34	Chemical Engineering: Principles	7	8	1
H92N	35	Aromatic Chemistry: Theory and Laboratory Skills	8	8	1
HF0L	35	Chemical Process Technology: Graded Unit 2	8	16	2
HE3J	35	Process Operations: Heat Exchange, Drying and Evaporation	8	8	1
HE3E	34	Fluid Mechanics: Theory and Laboratory Skills	7	8	1
J5R2*	35	Instrumental Techniques 1	8	8	1
HE3G	34	Industrial Chemicals: Processes and Products	7	8	1
HE3F	34	Process Safety Engineering	7	8	1
H97R	35	Process Operations: Distillation	8	8	1
H938	35	Thermodynamics and Kinetics: Theory and Laboratory Skills	8	8	1
H97T	34	Heat Transfer Theory and Practical Skills	7	8	1
H935	35	Phase Equilibrium and Surface Chemistry	8	8	1
H92P	35	Base-Catalysed and Organometallic Chemistry: Theory and Laboratory Skills	8	8	1
H92Y	34	Inorganic Chemistry: Theory and Laboratory Skills	7	8	1

Mandatory Units (2–3 credits)

Code		Unit title	SCQF level	SCQF credit points	SQA credit
H7K0	33	Engineering Mathematics 1	6	8	1
H7K1	34	Engineering Mathematics 2	7	8	1
H7K2	34	Engineering Mathematics 3	7	8	1

Optional Section A (3–8 credits)

Code		Unit title	SCQF level	SCQF credit points	SQA credit
H931	35	Instrumental Techniques 2	8	8	1
H932	35	Main Group Inorganic Chemistry	8	8	1
H92T	35	Electrochemistry	8	8	1
H934	35	Organic Stereochemistry: Theory and Laboratory Skills	8	8	1
H93G	34	Physics Principles: Heat and Thermodynamics	7	8	1
H97M	34	Fermentation Engineering	7	8	1
HE3H	34	Process Water and Steam Services	7	8	1
H97L	34	Chemical Engineering: Applied Physical Chemistry	7	8	1
DW1E	34	CAD: 2D I	7	8	1
H93H	34	Physics Principles: Mechanics	7	8	1
DF82	34	Quality and Health & Safety Systems in Science Industries	7	8	1
H92W	33	Fundamental Chemistry: An Introduction	6	8	1
H939	35	Transition Metal Chemistry: Theory and Laboratory Skills	8	8	1
DT4X	35	Environmental Sampling and Analysis	8	8	1
H97P	34	Industrial Biotechnology: Processing	7	8	1
H91V	34	Laboratory Skills for Science Industries	7	16	2
H7K3	35	Engineering Mathematics 4	8	8	1
H7K4	35	Engineering Mathematics 5	8	8	1
D75X	34	Information Technology: Applications Software 1	7	8	1
DX4K	34	Process Control	7	8	1

Optional Section B — Broadening Units (0–4 credits)

Code		Unit title	SCQF level	SCQF credit points	SQA credit
H8T2	33	Workplace Communication in English	6	8	1
F1HW	34	ESOL for Work: Advanced Operational	7	24	3
DE3R	34	Personal Development Planning	7	8	1
DG6E	34	Work Role Effectiveness	7	24	3
DG6G	35	Work Role Effectiveness	8	24	3

*Refer to History of Changes for revision changes.

This Group Award is made up of 30 SQA Unit credits and comprises of 240 SCQF credit points. 176 SCQF credit points are required to be achieved from the mandatory sections. Learners then select optional Units from the remaining sections to complete the total of 240 SCQF credit points. Depending on the SCQF credit points achieved from the mandatory sections, a further 56–64 SCQF credit points are required from the optional Sections A–B.

The *Chemical Process Technology: Graded Unit 1* is an investigative report. The purpose of the *Chemical Process Technology: Graded Unit 1* is to assess the learner's ability to integrate and apply the knowledge and skills gained in the individual Units to demonstrate that they have achieved the specific aims of the Group Award and to grade learner achievement.

The *Chemical Process Technology: Graded Unit 2* is a laboratory based project, with an associated report. The purpose of the *Chemical Process Technology: Graded Unit 2* is to assess the learner's abilities in integrating and applying knowledge and skills, and to also develop high level advanced and independent practical skills.

3 Aims of the qualifications

The overall aim of the HNC/HND in Chemical Process Technology Group Awards is to provide a progressive, integrated and coherent education which will be responsive to the needs of learners, employers and higher institutions.

3.1 General aims of the qualifications

The general aims of the HNC/D Chemical Process Technology Group Awards are to develop:

- knowledge of study, research and analysis
- ability to define and solve problems
- transferable skills
- ability to be flexible and work co-operatively with others
- responsibility for own learning
- planning, organisation and review/evaluation skills
- oral and written scientific communication skills
- numerical and ICT skills
- employability skills
- flexibility, knowledge, skills and motivation as a basis for progression to further study within Higher National qualifications and/or graduate studies.

3.2 Specific aims of the qualifications

The aims of the HNC/HND in Chemical Process Technology Group Awards specify the knowledge and skills required to be deemed competent in this subject area/occupational area.

HNC in Chemical Process Technology

The specific aims of the HNC in Chemical Process Technology Group Award are to:

- Prepare learners for an appropriate level of employment, in areas of the chemical sector such as laboratories, chemicals production, pharmaceutical, food and agriculture production and environmental science.
- Develop a range of contemporary vocational skills relating to the use, support and development of systems appropriate to employment at technician or professional level.
- Provide learners with a range of skills to support learning in relevant SVQ 3 level programmes.
- Provide learners with an element of vocational specialisation in a variety of areas such as laboratory work, chemical production, agriculture, energy and environmental science.

- Prepare learners for progression to further studies in process engineering, chemical engineering and related disciplines.
- Provide a flexible route to the Group Award, allowing access to those in employment through part-time study and full-time provision.
- Provide an opportunity for learners to discover which areas of chemical process most interest them by providing experience of each of the main branches of the subject area which is diverse and varied.
- Provide a wider range of practical laboratory skills to enhance job prospects through the practical content of the course.
- Provide learners with a sound academic basis for the continuing development of practical and conceptual skills.

HND in Chemical Process Technology

The specific aims of the HND in Chemical Process Technology Group Award are to:

- Prepare learners for an appropriate level of employment, in areas of the chemical sector such as laboratories, chemicals production, pharmaceutical, food and agriculture production and environmental science.
- Develop a range of contemporary vocational skills relating to the use, support and development of systems appropriate to employment at technician or professional level.
- Provide learners with a range of study and research skills, including to support learning in relevant SVQ 4 level programmes.
- Provide learners with an element of vocational specialisation in a variety of areas such as laboratory work, chemical production, agriculture, energy and environmental science.
- Prepare learners for progression to further studies in process engineering, chemical engineering and related disciplines, including direct entry to stage 3 degree.
- Provide a flexible route to the Group Award, allowing access to those in employment through part-time study and full-time provision.
- Provide an opportunity for learners to discover which areas of chemical process most interest them by providing experience of each of the main branches of the subject area which is diverse and varied.
- Provide a wider range of practical laboratory skills to enhance job prospects through the practical content of the course. These skills should be at SCQF level 8.
- Continue development of practical and conceptual skills from SCQF level 7 to SCQF level 8.

3.3 Graded Units

The purpose of the Graded Units is to assess the learner's ability to integrate and apply the knowledge and skills gained in individual Units to demonstrate that they have achieved the specific aims of the Group Awards.

Learners will undertake the 1 credit *Chemical Process Technology: Graded Unit 1* at SCQF level 7 for the HNC in Chemical Process Technology Group Award. Learners will undertake the 2 credit *Chemical Process Technology: Graded Unit 2* at SCQF level 8 along with the *Chemical Process Technology: Graded Unit 1* at SCQF level 7 to complete the HND in Chemical Process Technology Group Award.

The *Chemical Process Technology*: *Graded Unit 1* will take the form of an investigation report. It will cover a range of skills achieved through studying the mandatory Units within the Group Award. It allows learners to use research skills, set timescales, identify main issues, methods and sources of research and develop scientific reporting skills.

Learners will be required to produce reports covering planning, development and evaluation of the investigation.

The *Chemical Process Technology: Graded Unit 1* is designed to provide evidence that the learner has achieved the following aims of the HNC in Chemical Process Technology Group Award:

- develop learners' knowledge and skills such as planning, developing and evaluating
- develop employment skills and enhancing learners' employment prospects
- enable progression within the Scottish Credit and Qualifications Framework (SCQF)
- develop transferable skills including Core Skills
- prepare for employment in a chemical process technology or related post at technician or professional level
- develop a range of vocational skills appropriate to employment at technician or professional level in the chemical science sector

The *Chemical Process Technology: Graded Unit 2* at SCQF level 8 will take the form of a laboratory-based project with an associated investigation report. It allows learners to use research skills, set timescales, identify main issues, methods and sources of research and develop scientific reporting skills.

Learners will be required to produce reports covering planning, development and evaluation of the investigation.

The *Chemical Process Technology: Graded Unit 2* is designed to provide evidence that the learner has achieved the following aims of the HND in Chemical Process Technology Group Award:

- prepare learners for an appropriate level of employment
- develop a range of contemporary vocational skills including investigative skills, developing health and safety skills in a practical environment or as part of a design project and enhancing risk assessment skills
- prepare learners for progression to further studies
- provide learners with a wider range of practical laboratory skills or process equipment/plant design skills
- develop study and research skills
- develop Core Skills such as *Working with Others* in a team environment

In addition, for both *Chemical Process Technology: Graded Unit 1* and *Chemical Process Technology: Graded Unit 2* the learner will develop a variety of supplementary skills which enhance life skills and the educational experience. These skills are associated with enterprise, employability, sustainability, and citizenship.

4 Recommended entry to the qualifications

Entry to this qualification is at the discretion of the centre. The following information on prior knowledge, skills, experience or qualifications that provide suitable preparation for this qualification has been provided by the Qualification Design Team (QDT) as guidance only.

Learners would benefit from having attained the skills, knowledge and understanding required by one or more of the following or equivalent qualifications and/or experience:

The following qualifications are given as guidelines only:

- A minimum of two Highers from Chemistry, Mathematics or Physics at Grade C or above, with appropriate supporting passes at National 5 level (or equivalent SCQF level 5) in appropriate science subjects and Mathematics.
- NC Applied Sciences level 6
- Qualifications in appropriate science, chemical process technology and mathematics programmes, such as Access programmes. Learners should have gained some Units at higher level in appropriate science, chemical process technology and mathematics programmes.
- Suitable work experience gained in a chemical process setting

It is intended that admission to the HNC/HND in Chemical Process Technology Group Awards should be as broadly based as possible, but that this should be consistent with the selection of learners who have the appropriate knowledge and skills to successfully achieve the HNC/HND in Chemical Process Technology Group Awards.

4.1 Core Skills entry profile

The Core Skills entry profile provides a summary of the associated assessment activities that exemplify why a particular level has been recommended for this qualification. The information below should be used to identify if additional learning support needs to be put in place for learners whose Core Skills profile is below the recommended entry level or whether learners should be encouraged to do an alternative level or learning programme.

It should be noted that although there is no mandatory entry and exit levels the following is recommended:

Core Skill	Recommended SCQF entry profile	Associated assessment activities
Communication	SCQF level 5	Research, analysis, report, oral presentation.
Numeracy	SCQF level 5	Numerical and graphical presentation, numerical and algebraic calculations.
Information and Communication Technology (ICT)	SCQF level 5	Accessing information for research purposes, assimilation and analysis of research information. Creation of graphical and narrative material for report and presentation purposes.
Problem Solving	SCQF level 5	Critical thinking, planning and evaluation.
Working with Others	SCQF level 4	Co-operative working as part of a team for practical activities.

5 Additional benefits of the qualification in meeting employer needs

These qualifications were designed to meet a specific purpose and what follows are details on how that purpose has been met through mapping of the Units to the aims of the qualification. Through meeting the aims, additional value has been achieved by linking the Unit standards with those defined in National Occupational Standards and/or trade/professional body requirements. In addition, significant opportunities exist for learners to develop the more generic skills, known as Core Skills, through doing these qualifications.

5.1 Mapping of qualification aims to Units

HNC in Chemical Process Technology

Code	Unit title	General Aims									
		1	2	3	4	5	6	7	8	9	10
H92X 34	Fundamental Chemistry: Theory and Laboratory Skills	X	X	X	X	X	X	X	X	X	X
H933 34	Organic Chemistry: Theory and Laboratory Skills	X	X	X	X	X	X	X	X	X	X
H936 34	Physical Chemistry: Theory and Laboratory Skills	X	X	X	X	X	X	X	X	X	X
HF0K 34	Chemical Process Technology: Graded Unit 1	X	X	X		X	X	X	X	X	X
H97N 34	Chemical Engineering: Principles	X	X	X		X			X	X	X
HE3F 34	Process Safety Engineering	X	X	X		X			X	X	X
H97T 34	Heat Transfer Theory and Practical Skills	X	X	X	X	X	X	X	X	X	X
HE3E 34	Fluid Mechanics: Theory and Laboratory Skills	X	X	X	X	X	X	X	X	X	X
H7K0 33	Engineering Mathematics 1	X	X	X		X	X		X	X	X
H7K1 34	Engineering Mathematics 2	X	X	X		X	X		X	X	X
HE3G 34	Industrial Chemicals: Processes and Products	X	X	X		X			X	X	X
H93H 34	Physics Principles: Mechanics	X	X	X	X	X	X	X	X	X	X
H93G 34	Physics Principles: Heat and Thermodynamics	X	X	X	X	X	X	X	X	X	X
DF82 34	Quality and Health & Safety Systems in Science Industries	X	X	X		X	X	X	X	X	X

Code	Unit title	General Aims									
		1	2	3	4	5	6	7	8	9	10
H92W 33	Fundamental Chemistry: An Introduction	X	X	X	X	X	X	X	X	X	X
J5R2* 35	Instrumental Techniques 1	X	X	X	X	X	X	X	X	X	X
H7K2 34	Engineering Mathematics 3	X	X	X		X	X		X	X	X
D75X 34	Information Technology: Applications Software 1		X	X		X	X		X	X	X
H92Y 34	Inorganic Chemistry: Theory and Laboratory Skills	X	X	X	X	X	X	X	X	X	X
H91V 34	Laboratory Skills for Science Industries	X	X	X	X	X	X	X	X	X	X
H97P 34	Industrial Biotechnology: Processing	X	X	X		X			X	X	X
H97L 34	Chemical Engineering: Applied Physical Chemistry	X	X	X		X			X	X	X
H8T2 33	Workplace Communication in English	X		X	X	X	X	X	X	X	X
DE3R 34	Personal Development Planning		X	X		X	X		X	X	X

HND in Chemical Process Technology

Code	Unit title	General Aims									
		1	2	3	4	5	6	7	8	9	10
H92X 34	Fundamental Chemistry: Theory and Laboratory Skills	X	X	X	X	X	X	X	X	X	X
H933 34	Organic Chemistry: Theory and Laboratory Skills	X	X	X	X	X	X	X	X	X	X
H936 34	Physical Chemistry: Theory and Laboratory Skills	X	X	X	X	X	X	X	X	X	X
HF0K 34	Chemical Process Technology: Graded Unit 1	X	X	X		X	X	X	X	X	X
H97N 34	Chemical Engineering: Principles	X	X	X		X			X	X	X
H92N 35	Aromatic Chemistry: Theory and Laboratory Skills	X	X	X	X	X	X	X	X	X	X
HF0L 35	Chemical Process Technology: Graded Unit 2	X	X	X	X	X	X	X	X	X	X
HE3J 35	Process Operations: Heat Exchange, Drying and Evaporation	X	X	X		X			X	X	X
HE3E 34	Fluid Mechanics: Theory and Laboratory Skills	X	X	X	X	X	X	X	X	X	X
J5R2* 35	Instrumental Techniques 1	X	X	X	X	X	X	X	X	X	X
HE3G 34	Industrial Chemicals: Processes and Products	X	X	X		X			X	X	X
HE3F 34	Process Safety Engineering	X	X	X		X			X	X	X
H97R 35	Process Operations: Distillation	X	X	X	X	X	X	X	X	X	X
H938 35	Thermodynamics and Kinetics: Theory and Laboratory Skills	X	X	X	X	X	X	X	X	X	X

Code	Unit title	General Aims									
		1	2	3	4	5	6	7	8	9	10
H97T 34	Heat Transfer Theory and Practical Skills	X	X	X	X	X	X	X	X	X	X
H935 35	Phase Equilibrium and Surface Chemistry	X	X	X	X	X	X	X	X	X	X
H92P 35	Base-Catalysed and Organometallic Chemistry: Theory and Laboratory Skills	X	X	X	X	X	X	X	X	X	X
H92Y 34	Inorganic Chemistry: Theory and Laboratory Skills	X	X	X	X	X	X	X	X	X	X
H7K0 33	Engineering Mathematics 1	X	X	X		X	X		X	X	X
H7K1 34	Engineering Mathematics 2	X	X	X		X	X		X	X	X
H7K2 34	Engineering Mathematics 3	X	X	X		X	X		X	X	X
H931 35	Instrumental Techniques 2	X	X	X	X	X	X	X	X	X	X
H932 35	Main Group Inorganic Chemistry	X	X	X	X	X	X	X	X	X	X
H92T 35	Electrochemistry	X	X	X	X	X	X	X	X	X	X
H934 35	Organic Stereochemistry: Theory and Laboratory Skills	X	X	X	X	X	X	X	X	X	X
H93G 34	Physics Principles: Heat and Thermodynamics	X	X	X	X	X	X	X	X	X	X
H97M 34	Fermentation Engineering	X	X	X		X	X		X	X	X
HE3H 34	Process Water and Steam Services	X	X	X		X	X		X	X	X
H97L 34	Chemical Engineering: Applied Physical Chemistry	X	X	X		X			X	X	X
DW1E 34	CAD: 2D I	X	X	X		X			X	X	X

Code	Unit title	General Aims									
		1	2	3	4	5	6	7	8	9	10
H93H 34	Physics Principles: Mechanics	X	X	X	X	X	X	X	X	X	X
DF82 34	Quality and Health & Safety Systems in Science Industries	X	X	X		X	X	X	X	X	X
H92W 33	Fundamental Chemistry: An Introduction	X	X	X	X	X	X	X	X	X	X
H939 35	Transition Metal Chemistry: Theory and Laboratory Skills	X	X	X	X	X	X	X	X	X	X
DT4X 35	Environmental Sampling and Analysis	X	X	X	X	X	X	X	X	X	X
H97P 34	Industrial Biotechnology: Processing	X	X	X		X			X	X	X
H91V 34	Laboratory Skills for Science Industries	X	X	X	X	X	X	X	X	X	X
H7K3 35	Engineering Mathematics 4	X	X	X		X	X		X	X	X
H7K4 35	Engineering Mathematics 5	X	X	X		X	X		X	X	X
D75X 34	Information Technology: Applications Software 1		X	X		X	X		X	X	X
DX4K 34	Process Control	X	X	X		X	X	X		X	X
H8T2 33	Workplace Communication in English	X		X	X	X	X	X	X	X	X
F1HW 34	ESOL for Work: Advanced Operational	X		X	X	X	X	X	X	X	X
DE3R 34	Personal Development Planning		X	X		X	X		X	X	X
DG6E 34	Work Role Effectiveness	X	X	X	X	X	X	X	X	X	X
DG6G 35	Work Role Effectiveness	X	X	X	X	X	X	X	X	X	X

5.2 Mapping of National Occupational Standards (NOS)

The HNC/HND in Chemical Process Technology Group Awards have been mapped against the level 4 SVQ Life Sciences and Related Industries.

Code	National Occupational Standard	Aromatic Chemistry: Theory and Laboratory Skills (H92N 35)	Base-Catalysed and Organometallic Chemistry: Theory and Laboratory Skills (H92P 35)	Chemical Engineering: Principles (H97N 34)	Engineering Mathematics 1 (H7K0 33)	Engineering Mathematics 2 (H7K1 34)	Engineering Mathematics 3 (H7K2 34)	Fluid Mechanics: Theory and Laboratory Skills (HE3E 34)	Fundamental Chemistry: Theory and Laboratory Skills (H92X 34)	Heat Transfer Theory and Practical Skills (H97T 34)	Industrial Chemicals: Processes and Products (HE3G 34)	Inorganic Chemistry: Theory and Laboratory Skills (H92Y 34)	Instrumental Techniques 1 (J5R2 35*)	Organic Chemistry: Theory and Laboratory Skills (H933 34)	Phase Equilibrium and Surface Chemistry (H935 35)	Physical Chemistry: Theory and Laboratory Skills (H936 34)	Process Operations: Distillation (H97R 35)	Process Operations: Heat Exchange, Drying and Evaporation (HE3J 35)	Process Safety Engineering (HE3F 34)	Thermodynamics and Kinetics: Theory and Laboratory Skills (H938 35)
H6F2 04	Maintain Effective and Efficient Working Relationships	X	X					X	X	X		X	X	X	X	X	X			X
H6FC 04	Preparing Reagents	X	X						X			X	X	X						
H6FK 04	Provide Technical Support for Computer Application Software and Equipment																			
H6FN 04	Provide Technical Advice and Guidance																			

Code	National Occupational Standard	Aromatic Chemistry: Theory and Laboratory Skills (H92N 35)	Base-Catalysed and Organometallic Chemistry: Theory and Laboratory Skills (H92P 35)	Chemical Engineering: Principles (H97N 34)	Engineering Mathematics 1 (H7K0 33)	Engineering Mathematics 2 (H7K1 34)	Engineering Mathematics 3 (H7K2 34)	Fluid Mechanics: Theory and Laboratory Skills (HE3E 34))	Fundamental Chemistry: Theory and Laboratory Skills (H92X 34)	Heat Transfer Theory and Practical Skills (H97T 34)	Industrial Chemicals: Processes and Products (HE3G 34)	Inorganic Chemistry: Theory and Laboratory Skills (H92Y 34)	Instrumental Techniques 1 (J5R2 35*)	Organic Chemistry: Theory and Laboratory Skills (H933 34)	Phase Equilibrium and Surface Chemistry (H935 35)	Physical Chemistry: Theory and Laboratory Skills (H936 34)	Process Operations: Distillation (H97R 35)	Process Operations: Heat Exchange, Drying and Evaporation (HE3J 35)	Process Safety Engineering (HE3F 34)	Thermodynamics and Kinetics: Theory and Laboratory Skills (H938 35)
H6FP 04	Prepare New Methods, Resources and Equipment for Learning Activities																			
H6FR 04	Improve the Quality and Reliability of Activities																			
H6FV 04	Amplifying and Analysing DNA or RNA Samples using PCR or qPCR																			
H6FW 04	Analysing Samples using Light Microscopy								X											
H6FY 04	Analysis of DNA using Gel Electrophoresis												X							
H6G0 04	Plan and Collect Samples for Testing																			

Code	National Occupational Standard	Aromatic Chemistry: Theory and Laboratory Skills (H92N 35)	Base-Catalysed and Organometallic Chemistry: Theory and Laboratory Skills (H92P 35)	Chemical Engineering: Principles (H97N 34)	Engineering Mathematics 1 (H7K0 33)	Engineering Mathematics 2 (H7K1 34)	Engineering Mathematics 3 (H7K2 34)	Fluid Mechanics: Theory and Laboratory Skills (HE3E 34)	Fundamental Chemistry: Theory and Laboratory Skills (H92X 34)	Heat Transfer Theory and Practical Skills (H97T 34)	Industrial Chemicals: Processes and Products HE3G 34)	Inorganic Chemistry: Theory and Laboratory Skills (H92Y 34)	Instrumental Techniques 1 (J5R2 35*)	Organic Chemistry: Theory and Laboratory Skills (H933 34)	Phase Equilibrium and Surface Chemistry (H935 35)	Physical Chemistry: Theory and Laboratory Skills (H936 34)	Process Operations: Distillation (H97R 35)	Process Operations: Heat Exchange, Drying and Evaporation (HE3J 35)	Process Safety Engineering HE3F 34)	Thermodynamics and Kinetics: Theory and Laboratory Skills (H938 35)
H6G1 04	Carry out Investigation	X	X					X	X	X		X	X	X	X	X	X		X	X
H6G2 04	Analysis of Samples using High Performance Liquid Chromatography								X				X							
H6G3 04	Analysis of Samples using Spectroscopy								X				X							
H6G4 04	Analysis of Samples using Gas Chromatography								X				X							
H6G5 04	Applying Basic Statistics																			
H6G6 04	Develop and Provide Training																			
H6G7 04	Culturing or Fermenting Cells																			
H6G8 04	Develop and Maintain Health and Safety Procedures																			

Code	National Occupational Standard	Aromatic Chemistry: Theory and Laboratory Skills (H92N 35)	Base-Catalysed and Organometallic Chemistry: Theory and Laboratory Skills (H92P 35)	Chemical Engineering: Principles (H97N 34)	Engineering Mathematics 1 (H7K0 33)	Engineering Mathematics 2 (H7K1 34)	Engineering Mathematics 3 (H7K2 34)	Fluid Mechanics: Theory and Laboratory Skills (HE3E 34)	Fundamental Chemistry: Theory and Laboratory Skills (H92X 34)	Heat Transfer Theory and Practical Skills (H97T 34)	Industrial Chemicals: Processes and Products (HE3G 34)	Inorganic Chemistry: Theory and Laboratory Skills (H92Y 34)	Instrumental Techniques 1 (J5R2 35*)	Organic Chemistry: Theory and Laboratory Skills (H933 34)	Phase Equilibrium and Surface Chemistry (H935 35)	Physical Chemistry: Theory and Laboratory Skills (H936 34)	Process Operations: Distillation (H97R 35)	Process Operations: Heat Exchange, Drying and Evaporation (HE3J 35)	Process Safety Engineering (HE3F 34)	Thermodynamics and Kinetics: Theory and Laboratory Skills (H938 35)
H6G9 04	Make Presentations in the Work Place																	X		
H6GA 04	Managing Budgets																			
H6GB 04	Providing Leadership																			
H6GC 04	Encourage Problem Solving and Innovation																			
H6GD 04	Establish and Implement Quality Assurance Processes																			

The HNC/HND in Chemical Process Technology Group Awards has also been mapped against the level 3 SVQ Process Industries Operations.

National Occupational Standard	**Aromatic Chemistry: Theory and Laboratory Skills (H92N 35)**	**Base-Catalysed and Organometallic Chemistry: Theory and Laboratory Skills (H92P 35)**	**Chemical Engineering: Principles (H97N 34)**	**Engineering Mathematics 1 (H7K0 33)**	**Engineering Mathematics 2 (H7K1 34)**	**Engineering Mathematics 3 (H7K2 34)**	**Fluid Mechanics: Theory and Laboratory Skills (HE3E 34)**	**Fundamental Chemistry: Theory and Laboratory Skills (H92X 34)**	**Heat Transfer Theory and Practical Skills (H97T 34)**	**Industrial Chemicals: Processes and Products (HE3G 34)**	**Inorganic Chemistry: Theory and Laboratory Skills (H92Y 34)**	**Instrumental Techniques 1 (J5R2 35*)**	**Organic Chemistry: Theory and Laboratory Skills (H933 34)**	**Phase Equilibrium and Surface Chemistry (H935 35)**	**Physical Chemistry: Theory and Laboratory Skills (H936 34)**	**Process Operations: Distillation (H97R 35)**	**Process Operations: Heat Exchange, Drying and Evaporation (HE3J 35)**	**Process Safety Engineering (HE3F 34)**	**Thermodynamics and Kinetics: Theory and Laboratory Skills (H938 35)**
Handover in Processing Industries Operations																			
Working Effectively in a Team in Processing Industries Operations							X		X							X			
Emergency Procedure in Processing Industries Operations																		X	
Control Room Operations in Processing Industries Operations																X			
Prepare for Complex Processing Operation in Processing Industries Operations																			
Control, Maintain and Restore Complex Processing Operation in Processing Industries Operations									X							X			
Complete a Complex Processing Operation in Processing Industries Operations							X		X							X			
Contribute to the Maintenance of Product Quality in Processing Industries Operations																X			

National Occupational Standard	Aromatic Chemistry: Theory and Laboratory Skills (H92N 35)	Base-Catalysed and Organometallic Chemistry: Theory and Laboratory Skills (H92P 35)	Chemical Engineering: Principles (H97N 34)	Engineering Mathematics 1 (H7K0 33)	Engineering Mathematics 2 (H7K1 34)	Engineering Mathematics 3 (H7K2 34)	Fluid Mechanics: Theory and Laboratory Skills (HE3E 34)	Fundamental Chemistry: Theory and Laboratory Skills (H92X 34)	Heat Transfer Theory and Practical Skills (H97T 34)	Industrial Chemicals: Processes and Products (HE3G 34)	Inorganic Chemistry: Theory and Laboratory Skills (H92Y 34)	Instrumental Techniques 1 (J5R2 35*)	Organic Chemistry: Theory and Laboratory Skills (H933 34)	Phase Equilibrium and Surface Chemistry (H935 35)	Physical Chemistry: Theory and Laboratory Skills (H936 34)	Process Operations: Distillation (H97R 35)	Process Operations: Heat Exchange, Drying and Evaporation (HE3J 35)	Process Safety Engineering (HE3F 34)	Thermodynamics and Kinetics: Theory and Laboratory Skills (H938 35)
Clean and Prepare Complex Items of Plant & Equipment for Production in Processing Industries Operations																			
Ensure Your Own Actions aim to Protect the Environment in Processing Industries Operations								X	X							X			
Control Emergencies and Critical Situations in Processing Industries Operations																			
Allocate Personnel to Maintain Processing in Processing Industries Operations																			
Plan to Maintain Product Integrity in Processing Industries Operations																			
Enable Individual Learning Through Coaching in Processing Industries Operations																			
Solving Process Problems in Processing Industries Operations			X				X	X	X							X	X		
Conduct an Assessment of Risks in the Workplace in Processing Industries Operations																			

National Occupational Standard	Aromatic Chemistry: Theory and Laboratory Skills (H92N 35)	Base-Catalysed and Organometallic Chemistry: Theory and Laboratory Skills (H92P 35)	Chemical Engineering: Principles (H97N 34)	Engineering Mathematics 1 (H7K0 33)	Engineering Mathematics 2 (H7K1 34)	Engineering Mathematics 3 (H7K2 34)	Fluid Mechanics: Theory and Laboratory Skills (HE3E 34)	Fundamental Chemistry: Theory and Laboratory Skills (H92X 34)	Heat Transfer Theory and Practical Skills (H97T 34)	Industrial Chemicals: Processes and Products (HE3G 34)	Inorganic Chemistry: Theory and Laboratory Skills (H92Y 34)	Instrumental Techniques 1 (J5R2 35*)	Organic Chemistry: Theory and Laboratory Skills (H933 34)	Phase Equilibrium and Surface Chemistry (H935 35)	Physical Chemistry: Theory and Laboratory Skills (H936 34)	Process Operations: Distillation (H97R 35)	Process Operations: Heat Exchange, Drying and Evaporation (HE3J 35)	Process Safety Engineering (HE3F 34)	Thermodynamics and Kinetics: Theory and Laboratory Skills (H938 35)
Identify Improvement to Energy Efficiency in Processing Industries Operations			X						X							X			
Enable Learning Through Demonstrations and Instruction in Processing Industries Operations																			

5.3 Mapping of Core Skills development opportunities across the qualifications

Unit code	Unit title	Communication		Numeracy		ICT		Problem Solving			Working with Others	
		Written	Oral	Using Number	Using Graphical Information	Accessing Information	Providing/Creating Information	Critical Thinking	Planning and Organising	Reviewing and Evaluating	Working Co-operatively with Others	Reviewing Co-operative Contribution
H92X 34	Fundamental Chemistry: Theory and Laboratory Skills	O		E	O	O	S	O	O	S	O	O
H933 34	Organic Chemistry: Theory and Laboratory Skills	O		O	O	O	S	O	O	S	O	O
H936 34	Physical Chemistry: Theory and Laboratory Skills	O		E	O	O	S	O	O	S	O	O
H7K0 33	Engineering Mathematics 1			E	O			O	O	O		
HF0K 34	Chemical Process Technology: Graded Unit 1	S	S	S	S	S	S	E	E	E	O	O
H97N 34	Chemical Engineering: Principles			E	O			S	O	O		
H92N 35	Aromatic Chemistry: Theory and Laboratory Skills	O		O	O	O	S	O	O	S	O	O
HF0L 35	Chemical Process Technology: Graded Unit 2	S	S	S	S	S	S	E	E	E	O	O
HE3J 35	Process Operations: Heat Exchange, Drying and Evaporation			S	S			S	O	O		
HE3E 34	Fluid Mechanics: Theory and Laboratory Skills			E	S			S	O			
J5R2 35*	Instrumental Techniques 1	O		S	O	O	S	E	E	E	O	O
HE3G 34	Industrial Chemicals: Processes and Products	S	S			S	S	S	S			

Unit code	Unit title	Communication		Numeracy		ICT		Problem Solving			Working with Others	
		Written	Oral	Using Number	Using Graphical Information	Accessing Information	Providing/Creating Information	Critical Thinking	Planning and Organising	Reviewing and Evaluating	Working Co-operatively with Others	Reviewing Co-operative Contribution
HE3F 34	Process Safety Engineering	S	S			S	S	S	S			
H97R 35	Process Operations: Distillation	S		E	S	O	O	S	O	O	S	O
H938 35	Thermodynamics and Kinetics: Theory and Laboratory Skills	O		E	O	O	S	O	O	S	O	O
H97T 34	Heat Transfer Theory and Practical Skills	S		E	S	O	O	E	O	O	S	O
H935 35	Phase Equilibrium and Surface Chemistry	O	O	E	E	O	O	E	O	O	O	O
H92P 35	Base-Catalysed and Organometallic Chemistry: Theory and Laboratory Skills	O		O	O	O	S	O	O	S	O	O
H92Y 34	Inorganic Chemistry: Theory and Laboratory Skills	O		E	O	O	S	O	O	S	O	O
H7K1 34	Engineering Mathematics 2			E	O			O	O	O		
H931 35	Instrumental Techniques 2			O	O	O	O	O	O	O		
H932 35	Main Group Inorganic Chemistry	O		S	O	O	S	O	O	S	O	O
H92T 35	Electrochemistry	S	S	O	O	O	O	S	S	S	O	O
H934 35	Organic Stereochemistry: Theory and Laboratory Skills	O		O	O	O	S	O	O	S	O	O
H93G 34	Physics Principles: Heat and Thermodynamics	O		E	O	O	S	O	O	S	O	O

Unit code	Unit title	Communication		Numeracy		ICT		Problem Solving			Working with Others	
		Written	Oral	Using Number	Using Graphical Information	Accessing Information	Providing/Creating Information	Critical Thinking	Planning and Organising	Reviewing and Evaluating	Working Co-operatively with Others	Reviewing Co-operative Contribution
H97M 34	Fermentation Engineering			E	O			S	O	O		
HE3H 34	Process Water and Steam Services	S		E	S	O	O	S	O	S	O	O
H97L 34	Chemical Engineering: Applied Physical Chemistry			E	S			S	O	O		
DW1E 34	CAD: 2D I				S		O	O	O	O		
H93H 34	Physics Principles: Mechanics	O		E	O	O	O	E	O	O		
DF82 34	Quality and Health & Safety Systems in Science Industries	S	S			O	O	O	O		S	S
H92W 33	Fundamental Chemistry: An Introduction	O		E	O	O	O	S	S	S	O	O
H939 35	Transition Metal Chemistry: Theory and Laboratory Skills	O		S	O	O	S	O	O	S	O	O
DT4X 35	Environmental Sampling and Analysis	O		O	O	O	O	S	S	S	S	S
H97P 34	Industrial Biotechnology: Processing	S	S	S	S	O	S	S	O	O		
H91V 34	Laboratory Skills for Science Industries	O	O	S	E	O	S	E	O	S	O	O
H7K2 34	Engineering Mathematics 3			E	O			O	O	O		
H7K3 35	Engineering Mathematics 4			E	O			O	O	O		
H7K4 35	Engineering Mathematics 5			E	O			O	O	O		

Unit code	Unit title	Communication		Numeracy		ICT		Problem Solving			Working with Others	
		Written	Oral	Using Number	Using Graphical Information	Accessing Information	Providing/Creating Information	Critical Thinking	Planning and Organising	Reviewing and Evaluating	Working Co-operatively with Others	Reviewing Co-operative Contribution
D75X 34	Information Technology: Applications Software 1					E	E	O	O	O		
DX4K 34	Process Control	O						O	O			
F1HW 34	ESOL for Work: Advanced Operational	S	S					O	O	O		
DG6E 34	Work Role Effectiveness	O	O	O	O	O	O	O	O	O	O	O
DG6G 35	Work Role Effectiveness	O	O	O	O	O	O	O	O	O	O	O
DE3R 34	Personal Development Planning	O	O			O	O	O	O	O		
H8T2 33	Workplace Communication in English	E	E			S	S	S	S	S	S	S

Key:

E = Embedded
S = Signposted
O = Opportunities

5.4 Assessment Strategy for the qualifications

In the majority of Units, theory based Outcomes are assessed holistically by means of an end of Unit closed-book assessment under controlled conditions. Practical Outcomes are evidenced by a variety of means; please consult individual specifications for clarification and details of arrangements. The Units in the following table are notable exceptions.

Unit	Assessment
Laboratory Skills for Science Industries	Outcome 1: Production of Control of Substances Hazardous to Health (COSHH) and risk assessments. Outcome 2: Practical activities and laboratory diaries/pro formas. Outcome 3: Evidence of presenting and analysing scientific information. Outcome 4: Production of laboratory reports/poster/oral presentation.
Chemical Process Technology: Graded Unit 1	Assessed by the use of a scientific report. The investigation brief should provide the learner with the opportunity to produce evidence that demonstrates she/he has met the aims of the Group Award.
Personal Development Planning	Assessed holistically by means of a personal development portfolio.
Chemical Process Technology: Graded Unit 2	Assessed by the undertaking of a laboratory based project/work based project and production of associated scientific report. The investigation brief should provide the learner with the opportunity to produce evidence that demonstrates she/he has met the aims of the Group Award.
Quality and Health & Safety Systems in Science Industries	Outcome 1: Assessment on key aspects of health and safety procedures in relation to science. Outcome 2: Assignment on an industrial quality system. Outcome 3: Industrial visit and associated report on quality and health and safety systems.
Work Role Effectiveness	Evidence for the Unit will include self-appraisal materials generated by the learner. This will be confirmed or amended by employer comment (or report) and assessed in a professional interview by the assessor for this Unit.

Unit	Assessment	
Workplace Communication in English	Outcome 1:	Summarising and evaluating a written business text which combines factual content and analysis.
	Outcome 2:	Producing a folio of at least three vocationally relevant documents which present and examine information and ideas.
	Outcome 3:	Taking part in sustained spoken communication which has a clear remit involving a complex vocational issue.

6 Guidance on approaches to delivery and assessment

6.1 Sequencing/integration of Units

The structure of the HNC/HND in Chemical Process Technology Group Awards allows a high degree of flexibility in the mode of delivery. The Group Awards can be offered on a full-time, part-time, day-release, block release basis, or as an evening mode of study. A distance learning delivery mode is possible provided adequate materials, tutorial support, assessment facilities and laboratory time exist. Centres should note however that assessed practical activities must take place under supervised conditions. Combination of delivery modes is also a possibility. Such combined modes of study may enable learners to complete the Group Awards in a shorter time period.

Centres will define which order the Units are undertaken based on learner recruitment patterns, mode of delivery, resource implications, and logical progression dictated by topic and content.

The Group Awards lend themselves to a wide range of delivery mechanisms including formal teaching, case studies, group work, tutorial, laboratory/practical work, field work and demonstration/coaching opportunities. A number of Units specifically indicate some of these approaches are to be utilised in assessment therefore it is important that learners have experienced them throughout the learning process.

The inclusion of SCQF level 6 Units in chemistry and mathematics within the HNC/HND in Chemical Process Technology framework provides an opportunity to support learners who have limited prior knowledge of either of these subjects. The opportunity to undertake these Units should be sequenced at an early stage of delivery.

While optional, the *Laboratory Skills for Science Industries* Unit could be integrated and evidence generated for this Unit from other Units throughout the Group Awards. It is important to note that the *Laboratory Skills for Science Industries* Unit has been designed so as to give learners the laboratory time necessary to develop essential practical skills, prior to assessment of set practical activities.

It is expected that the *Chemical Process Technology: Graded Unit 1* would be undertaken in the first year of the (full-time) programme and should use knowledge gained in the mandatory Units of the Group Award.

It is expected that the *Chemical Process Technology: Graded Unit 2* would be undertaken in the second year of the (full-time) programme and should use knowledge gained in the mandatory Units of the Group Award. Learners should have attained a high level of practical skills and experience before undertaking this Unit.

6.1.1 Delivery Schedule

There are many driving forces which determine a full-time delivery programme for any Group Award including accommodation, staff availability, materials and equipment.

The following table indicates a suggested delivery programme of Units over a two year full-time delivery programme operating on a two block delivery system.

It is envisaged the HNC Group Award would be similar to the HND Year 1 programme and therefore the suggested delivery model is the same. It is envisaged that the optional Units in the Year 1 programme are core Units from the HND Group Award in order for learners to progress to the HND Year 2 programme.

HND in Chemical Process Technology	
Suggested delivery for a full-time two year programme	
Year 1: Teaching Block 1	**Year 1: Teaching Block 2**
Engineering Mathematics 1 or 2	Organic Chemistry: Theory and Laboratory Skills
Heat Transfer Theory and Practical Skills	Physical Chemistry: Theory and Laboratory Skills
Fundamental Chemistry: Theory and Laboratory Skills	Chemical Process Technology: Graded Unit 1
Chemical Engineering: Principles	Process Safety Engineering
Optional Unit (could be Fundamental Chemistry: An Introduction)	Fluid Mechanics: Theory and Laboratory Skills
Optional Unit (could be Industrial Chemicals: Processes and Products)	Optional Units x 3 (could be: Inorganic Chemistry: Theory and Laboratory Skills; Instrumental Techniques 1; Engineering Mathematics 2 or 3)
Year 2: Teaching Block 1	**Year 2: Teaching Block 2**
Aromatic Chemistry: Theory and Laboratory Skills	Base Catalysed and Organometallic Chemistry: Theory and Laboratory Skills
Thermodynamics and Kinetics: Theory and Laboratory Skills	Process Operations: Heat Exchange, Drying and Evaporation
Process Operations: Distillation	Chemical Process Technology: Graded Unit 2
Phase Equilibrium and Surface Chemistry	
Optional Units x 7	

6.2 Recognition of Prior Learning

SQA recognises that learners gain knowledge and skills acquired through formal, non-formal and informal learning contexts.

In some instances, a full Group Award may be achieved through the recognition of prior learning. However, it is unlikely that a learner would have the appropriate prior learning and experience to meet all the requirements of a full Group Award.

The recognition of prior learning may **not** be used as a method of assessing in the following types of Units and assessments:

- HN Graded Units
- Course and/or external assessments
- Other integrative assessment Units (which may or not be graded)
- Certain types of assessment instruments where the standard may be compromised by not using the same assessment method outlined in the Unit
- Where there is an existing requirement for a licence to practice
- Where there are specific health and safety requirements
- Where there are regulatory, professional or other statutory requirements
- Where otherwise specified in an Assessment Strategy

More information and guidance on the *Recognition of Prior Learning* (RPL) may be found on our website **www.sqa.org.uk**.

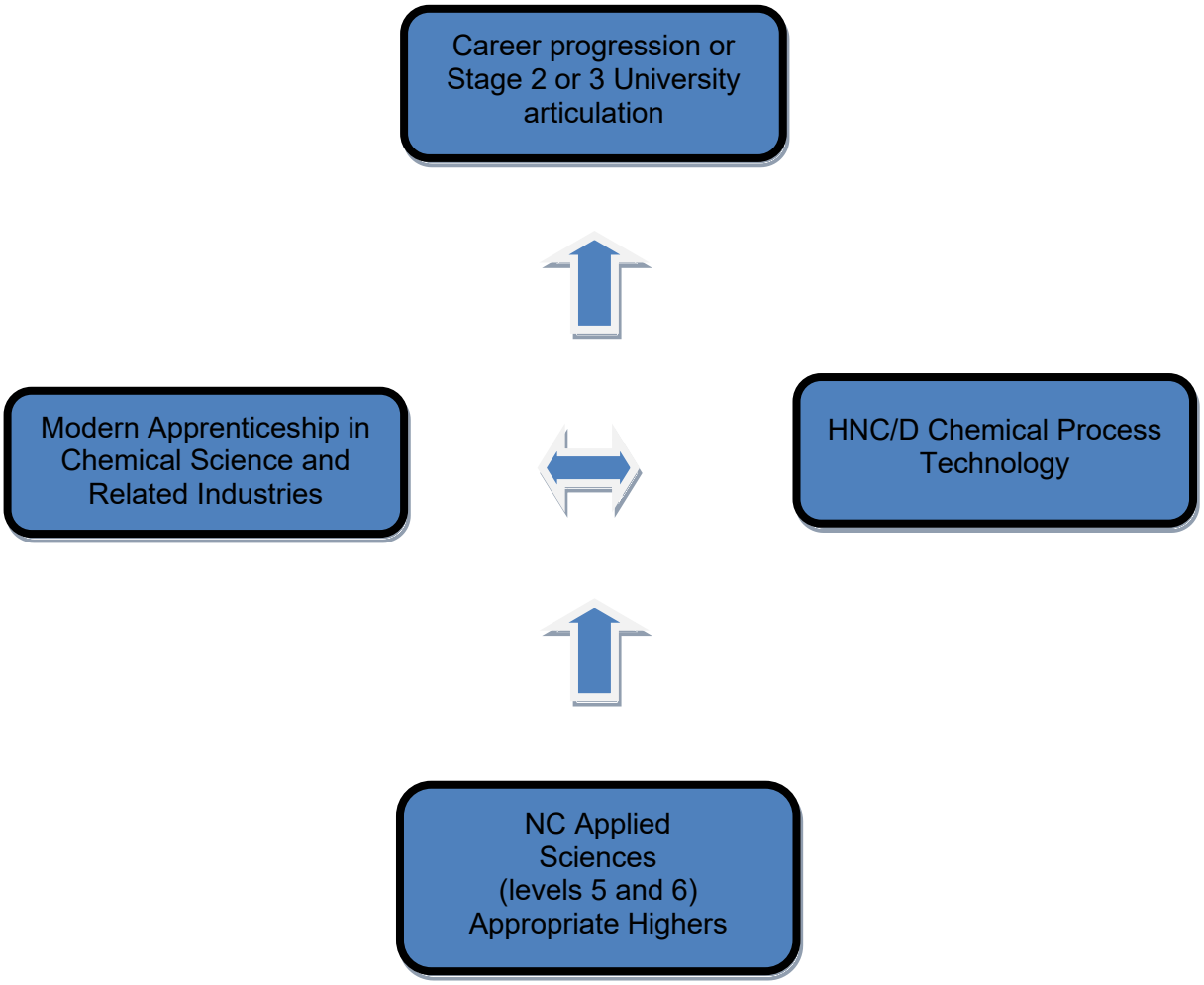
The following sub-sections outline how existing SQA Unit(s) may contribute to this Group Award. Additionally, they also outline how this Group Award may be recognised for professional and articulation purposes.

6.2.1 Articulation and/or progression

The HNC in Chemical Process Technology Group Award is designed to articulate with the HND in Chemical Process Technology Group Award. Learners on full-time provision should complete the HNC in Chemical Process Technology Group Award with 15 credits to allow progression to the HND in Chemical Process Technology Group Award.

The HNC in Chemical Process Technology Group Award allows progression direct to Year 2 at higher educational institutions. Learners on this route will require to complete the HNC in Chemical Process Technology Group Award with 15 credits. The HND in Chemical Process Technology Group Award allows progression direct to Year 3 at higher educational institutions. Centres are advised to work in partnership with higher educational institutions to ensure that relevant options for progression are achieved.

The following diagram illustrates potential progression routes:



6.2.2 Transitional Arrangements

It is recommended that learners who are in the process of completing the predecessor Group Award finish this rather than switching to the new Group Award. However, there may be occasions when it is not possible for learners to complete the existing Group Award, eg where they were unable to complete their studies due to ill health or difficulties with funding or employment and where the centre has progressed to offer the new Group Award and only one or two Units need to be completed. In these cases it is recommended that the following suggested credit transfer arrangements be considered.

6.2.3 Credit transfer

New Unit Code	New Unit Title	Old Unit Code	Old Unit Title	Direct Credit Transfer	Elements of Credit Transfer
H92X 34	Fundamental Chemistry: Theory and Laboratory Skills	DH2K 34	Fundamental Chemistry: Theory and Practice	Yes	
H933 34	Organic Chemistry: Theory and Laboratory Skills	DP2P 34	Fundamental Concepts of Organic Chemistry	Yes	
H936 34	Physical Chemistry: Theory and Laboratory Skills	DP2R 34	Fundamental Concepts of Physical Chemistry	Yes	
H7K0 33	Engineering Mathematics 1	DN8D 33	Mathematics for Science 1	No	
HF0K 34	Chemical Process Technology: Graded Unit 1	F4CH 34	Chemical Process Technology: Graded Unit 1	Yes	
H97N 34	Chemical Engineering: Principles	F3X8 34	Chemical Engineering Principles	Yes	
H92N 35	Aromatic Chemistry: Theory and Laboratory Skills	DP54 35	Aromatic Chemistry	Yes	
HF0L 35	Chemical Process Technology: Graded Unit 2	F4CJ 35	Chemical Process Technology: Graded Unit 2	Yes	

New Unit Code	New Unit Title	Old Unit Code	Old Unit Title	Direct Credit Transfer	Elements of Credit Transfer
HE3J 35	Process Operations: Heat Exchange, Drying and Evaporation	F3XG 35	Process Operations: Heat Exchange, Drying and Evaporation	Yes	
HE3E 34	Fluid Mechanics: Theory and Laboratory Skills	F3XB 34	Fluid Mechanics: Theory and Practice	Yes	
J5R2 35	Instrumental Techniques 1	H930 35	Instrumental Techniques 1	Yes	
HE3G 34	Industrial Chemicals: Processes and Products	F3XD 34	Industrial Chemicals: Processes and Products	Yes	
HE3F 34	Process Safety Engineering	F43J 34	Process Safety Engineering	Yes	
H97R 35	Process Operations: Distillation	F3XF 35	Process Operations: Distillation	Yes	
H938 35	Thermodynamics and Kinetics: Theory and Laboratory Skills	DP4N 35	Thermodynamics and Kinetics	Yes	
H97T 34	Heat Transfer Theory and Practical Skills	F3XC 34	Heat Transfer: Theory and Practice	Yes	
H935 35	Phase Equilibrium and Surface Chemistry	DP5X 35	Phase Equilibrium and Surface Chemistry	Yes	

New Unit Code	New Unit Title	Old Unit Code	Old Unit Title	Direct Credit Transfer	Elements of Credit Transfer
H92P 35	Base-Catalysed and Organometallic Chemistry: Theory and Laboratory Skills	DP5W 35	Base-Catalysed Reactions and Organometallic Reagents in Organic Synthesis	Yes	
H92Y 34	Inorganic Chemistry: Theory and Laboratory Skills	DP2N 34	Fundamental Concepts of Inorganic Chemistry	No	Pass of Unit DP2N 34 credits Outcome 4
H7K1 34	Engineering Mathematics 2	DV9V 34	Mathematics for Science 2	No	
H931 35	Instrumental Techniques 2	DH2N 35	Instrumental Techniques: Theory and Practice 2	Yes	
H932 35	Main Group Inorganic Chemistry	DV9F 35	Main Group Inorganic Chemistry	Yes	
H92T 35	Electrochemistry	DP5V 35	Electrochemistry	Yes	
H934 35	Organic Stereochemistry: Theory and Laboratory Skills	DX2H 35	Organic Stereochemistry	No	Pass of Unit DX2H 35 credits Outcomes 1 and 2
H93G 34	Physics Principles: Heat and Thermodynamics	F43H 34	Physics Principles: Heat and Thermodynamics	Yes	
H97M 34	Fermentation Engineering	F3XA 34	Fermentation Engineering	Yes	

New Unit Code	New Unit Title	Old Unit Code	Old Unit Title	Direct Credit Transfer	Elements of Credit Transfer
HE3H 34	Process Water and Steam Services	F3XH 34	Process Water and Steam Services	Yes	
H97L 34	Chemical Engineering: Applied Physical Chemistry	F3X9 34	Chemical Engineering: Applied Physical Chemistry	Yes	
DW1E 34	CAD: 2D I	N/A		N/A	
H93H 34	Physics Principles: Mechanics	F3XE 34	Physics Principles: Mechanics	Yes	
DF82 34	Quality and Health & Safety Systems in Science Industries	N/A		N/A	
H92W 33	Fundamental Chemistry: An Introduction	DX29 33	Fundamental Chemistry: An Introduction	Yes	
H939 35	Transition Metal Chemistry: Theory and Laboratory Skills	DR0E 35	Transition Metal Chemistry	Yes	
DT4X 35	Environmental Sampling and Analysis	N/A		N/A	
H97P 34	Industrial Biotechnology: Processing	N/A		N/A	

New Unit Code	New Unit Title	Old Unit Code	Old Unit Title	Direct Credit Transfer	Elements of Credit Transfer
H91V 34	Laboratory Skills for Science Industries	DF82 34	Quality and Health & Safety Systems in Science Industries	No	Pass of Unit DF82 34 credits Outcome 1
		DG70 34	Presentation Skills in Science	No	Pass of Unit DG70 34 credits Outcome 4
H7K2 34	Engineering Mathematics 3	N/A		N/A	
H7K3 35	Engineering Mathematics 4	N/A		N/A	
H7K4 35	Engineering Mathematics 5	N/A		N/A	
D75X 34	Information Technology: Applications Software 1	N/A		N/A	
DX4K 34	Process Control	N/A		N/A	
H8T2 33	Workplace Communication in English	DE1K 33	Workplace Communication in English	Yes	
DE3R 34	ESOL for Work: Advanced Operational	N/A		N/A	
DE3R 34	Personal Development Planning	N/A		N/A	
DG6E 34	Work Role Effectiveness	N/A		N/A	
DG6G 35	Work Role Effectiveness	N/A		N/A	

6.3 Opportunities for e-assessment

E-assessment may be appropriate for some assessments in the Units comprising this Group Award. By e-assessment we mean assessment which is supported by Information and Communication Technology (ICT), such as e-testing or the use of e-portfolios or social software. Centres which wish to use e-assessment must ensure that the national standard is applied to all learner evidence and that conditions of assessment as specified in the Evidence Requirements are met, regardless of the mode of gathering evidence. The most up-to-date guidance on the use of e-assessment to support SQA's qualifications is available at **www.sqa.org.uk/e-assessment**.

6.4 Support materials

A **list of existing ASPs** is available to view on SQA's website.

6.5 Resource requirements

Delivering centres will require appropriate science and chemical engineering teaching laboratories and technical support. Centres will require appropriate laboratory resources to support the delivery of the practical elements of these Group Awards.

Centres will require to ensure that specific requirements in terms of documents, texts, and IT resources to support the learning processes within Units are met.

All staff delivering these Group Awards will require to hold a qualification appropriate to the Unit delivered.

7 General information for centres

Equality and inclusion

The Unit specifications making up this Group Award have been designed to ensure that there are no unnecessary barriers to learning or assessment. The individual needs of learners will be taken into account when planning learning experiences, selecting assessment methods or considering alternative evidence. Further advice can be found on our website **www.sqa.org.uk/assessmentarrangements**.

Internal and external verification

All instruments of assessment used within these qualifications 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* **www.sqa.org.uk/GuideToAssessment**.

8 Glossary of terms

Embedded Core Skills: Where the assessment evidence for the Unit also includes full evidence for complete Core Skill or Core Skill components. A learner successfully completing the Unit will be automatically certificated for the Core Skill. (This depends on the Unit having been successfully audited and validated for Core Skills certification.)

Finish date: The end of a Group Award's lapsing period is known as the finish date. After the finish date, the Group Award will no longer be live and the following applies:

- learners may not be entered for the Group Award
- the Group Award will continue to exist only as an archive record on the Awards Processing System (APS)

Graded Unit: Graded Units assess learners' 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 learners to retain and adapt their skills and knowledge.

Lapsing date: When a Group Award is entered into its lapsing period, the following will apply:

- the Group Award will be deleted from the relevant catalogue
- the Group Award specification will remain until the qualification reaches its finish date at which point it will be removed from SQA's website and archived
- no new centres may be approved to offer the Group Award
- centres should only enter learners whom they expect to complete the Group Award during the defined lapsing period

SQA credit value: The credit value allocated to a Unit gives an indication of the contribution the Unit makes to an SQA Group Award. An SQA credit value of 1 given to an SQA Unit represents approximately 40 hours of programmed learning, teaching and assessment.

SCQF: The Scottish Credit and Qualification Framework (SCQF) provides the national common framework for describing all relevant programmes of learning and qualifications in Scotland. SCQF terminology is used 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: SCQF credit points provide a means of describing and comparing the amount of learning that is required to complete a qualification at a given level of the Framework. One National Unit credit is equivalent to 6 SCQF credit points. One National Unit credit at Advanced Higher and one Higher National Unit credit (irrespective of level) is equivalent to 8 SCQF credit points.

SCQF levels: The level a qualification is assigned within the framework is an indication of how hard it is to achieve. The SCQF covers 12 levels of learning. HNCs and HNDs are available at SCQF levels 7 and 8 respectively. Higher National Units will normally be at levels 6–9 and Graded Units will be at level 7 and 8. National Qualification Group Awards are available at SCQF levels 2–6 and will normally be made up of National Units which are available from SCQF levels 2–7.

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

Signposted Core Skills: refers to opportunities to develop Core Skills arise in learning and teaching but are not automatically certificated.

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 learners for the Unit which has been revised where they are expected to complete the Unit before its finish date.

Version Number	Description	Date
05	**Additional optional unit:** H97L 34 Chemical Engineering: Applied Physical Chemistry unit added to the optional section of the HNC in Chemical Process Technology framework.	01/7/24
04	Minor amendments made to section 9.1 Course content	11/02/22
03	**Additional optional unit:** DX4K 34 Process Control added to the optional section of the HND in Chemical Process Technology framework.	07/12/21
02	**Revision of Unit:** J5R2 35 - Instrumental Techniques 1 has replaced H930 35 - Instrumental Techniques 1 which finishes on 01/08/2023 for both frameworks.	08/09/21

Acknowledgement

SQA acknowledges the valuable contribution that Scotland's colleges have made to the development of this qualification.

9 General information for learners

This section will help you decide whether this is the qualification for you by explaining what the qualification is about, what you should know or be able to do before you start, what you will need to do during the qualification and opportunities for further learning and employment.

The HNC/HND in Chemical Process Technology is a vocational qualification providing the knowledge and skills required for progression into further study and employment in the chemical sector.

The aims of the HNC/HND in Chemical Process Technology Group Awards are designed to:

- prepare you for an appropriate level of employment, in areas of the chemical sector such as laboratories, chemicals production, pharmaceutical, food and agriculture production and environmental science.
- develop a range of contemporary vocational skills relating to the use, support and development of systems appropriate to employment at technician or professional level.
- provide you with a range of skills to support learning in relevant SVQ 3/4 level programmes.
- provide you with an element of vocational specialisation in a variety of areas such as laboratory work, chemical production, agriculture, energy and environmental science.
- prepare you for progression to further studies in process engineering, chemical engineering and related disciplines
- provide a flexible route to the Group Award, allowing access to those in employment through part-time study and full-time provision.
- provide you with an opportunity to discover which areas of chemical process are of most interest to you by allowing you experience of each of the main branches of the subject area which is diverse and varied.
- develop study and research skills.
- develop Core Skills such as working with others in a team environment and communication.

9.1 Course Content

In order to achieve the HNC in Chemical Process Technology, you must achieve 12 credits as follows:

Section	Credits required	Notes
Mandatory Units	6 credits must be achieved	
Mandatory Units	2 credits must be achieved	A further 1 credit could be achieved from this section
Mandatory Units	1 credit must be achieved	A further 1 credit could be achieved from this section
Optional Sections A and B	1–3 credits must be achieved, depending on the choice of Units in the mandatory sections	

In order to achieve the HND in Chemical Process Technology, you must achieve 30 credits as follows:

Section	Credits required	Notes
Mandatory Units	20 credits must be achieved	
Mandatory Units	2 credits must be achieved	A further 1 credit could be achieved from this section
Optional Sections A and B	7–8 credits must be achieved, depending on the choice of Units in the mandatory sections	Maximum of 8 credits from optional section A Maximum of 4 credits from optional section B

It is recommended that all learners be given a copy of the Group Award structures from Section 2 with clarification and explanation as appropriate. You should liaise with your lecturer to ensure that you complete the necessary Units to achieve the Group Award itself but also that progression routes remain open to you.

Assessment methods will be varied throughout the course and will include closed-book assessments, projects, reports and practical assignments. There may be presentations and case studies for some assessments. To pass a practical Outcome you will be expected to perform a range of laboratory experiments to a required standard, and to produce a report/ pro forma on the experiment.

The HNC includes one Graded Unit. This is a project which you will select the topic for, plan, develop and then evaluate the work you have carried out. The topic selected will be related to your studies. The HND has a second Graded Unit. This Graded Unit will be a practical or design based project. It may be carried out in your place of study or if you are employed in a relevant job you may carry out a work-based project. The topic again will be related to your studies.

The purpose of the Graded Units is to assess your ability to integrate and apply the knowledge and skills that you will have gained during your period of study. On successful completion of each Graded Unit you will be awarded a Grade of A, B or C. This grading applies only to the relevant Graded Unit and not the overall Group Award.

The HNC/HND will develop Core Skills in *Numeracy, ICT, Working with Others* and *Problem Solving*. Some Units will give automatic certification for Core Skills, while others will give you the opportunity to develop these skills.

Completion of the HNC/HND will give a qualification that has been designed for the Chemical Process Technology industry and will give you the skills and knowledge suitable for employment in the sector.

Progression opportunities to and from the HNC/HND in Chemical Process Technology Group Awards are illustrated in the following diagram: