



**Arrangements for:  
HND Applied Sciences  
Group Award Code: G86E 16**

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## **Acknowledgement**

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

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## 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
06	<p><b>Mandatory Units</b></p> <p>Fundamental Chemistry: Theory and Laboratory Skills (H92X 34) added as an alternative to Fundamental Chemistry: Theory and Practice (DH2K 34)</p> <p>Cell Biology: Theory and Laboratory Skills (H927 34) added as an alternative to Cell Biology: Theory and Practice (DJ1K 34)</p> <p>Organic Chemistry: Theory and Laboratory Skills (H933 34) added as an alternative to Fundamental Concepts of Organic Chemistry (DP2P 34)</p> <p>Inorganic Chemistry: Theory and Laboratory Skills (H92Y 34) added as an alternative to Fundamental Concepts of Inorganic Chemistry</p> <p>Physical Chemistry: Theory and Laboratory Skills (H936 34) added as an alternative to Fundamental Concepts of Physical Chemistry (DP2R 34)</p> <p>Animal Biology (H921 35) added as an alternative to Animal Biology (DP4L 34)</p> <p>Aromatic Chemistry: Theory and Laboratory Skills (H92N 35) added as an alternative to Aromatic Chemistry (DP54 35)</p> <p>Transition Metal Chemistry: Theory and Laboratory Skills (H939 35) added as an alternative to Transition Metal Chemistry (DR0E 35)</p> <p>Thermodynamics and Kinetics: Theory and Laboratory Skills (H938 35) added as an alternative to Thermodynamics and Kinetics (DP4N 35)</p> <p><b>Optional Units</b></p> <p>Biotechnology: An Introduction (H926 34) added as an alternative to Biotechnology: An Introduction (DJ00 34)</p> <p>Electrochemistry (H92T 35) added as an alternative to Electrochemistry (DP5V 35)</p> <p>Instrumental Techniques 1 (H930 35) added as an alternative to Instrumental Techniques: Theory and Practice 1 (DH54 35)</p> <p>Instrumental Techniques 2 (H931 35) added as an alternative to Instrumental Techniques: Theory and Practice 2 (DH2N 35)</p> <p>Biochemistry: Theory and Laboratory Skills (H922 34) added as an alternative to Biochemistry: Theory and Practice (DH2J 34)</p> <p>DNA and Molecular Techniques (H92A 35) added as an</p>	10/09/2015

Version number	Description	Date
	<p>alternative to DNA and Molecular Techniques: Theory and Practice (DJ6X 35)</p> <p>Immunological Techniques (H92E 35) added as an alternative to Immunological Techniques: Theory and Practice (DH2L 35)</p> <p>Fundamental Chemistry: An Introduction (H92W 33) added as an alternative to Fundamental Chemistry: An Introduction (DX29 33)</p> <p>Organic Stereochemistry: Theory and Laboratory Skills (H934 35) added as an alternative to Organic Stereochemistry (DX2H 35)</p> <p>Main Group Inorganic Chemistry (H932 35) added as an alternative to Main Group Inorganic Chemistry (DV9F 35)</p> <p>Science Industry: Key Issues (H92K 34) added as an alternative to Science Industry: Key Issues (DP9M 34)</p>	
05	<b>Revision of Unit:</b> DN37 34 Ecology and Ecosystems has been revised by H93A 34 Ecology and Ecosystems and finishes on 31/07/2017.	16/07/15
05	<b>Revision of Unit:</b> DP4Y 34 Environmental Chemistry has been revised by H92V 35 Environmental Chemistry: Theory and Laboratory Skills and finishes on 31/07/2017.	16/07/15
05	<b>Revision of Unit:</b> H0PM 35 Chemistry: Laboratory Practical Skills has been revised by H92R 35 Chemistry: Laboratory Practical Skills and finishes on 31/07/2017.	16/07/15
05	<b>Revision of Unit:</b> FV6W 35 Spectroscopic and Analytical Techniques: Theory and Practice has been revised by H937 35 Spectroscopic and Analytical Techniques and finishes on 31/07/2017.	16/07/15
05	<b>Revision of Unit:</b> DG6Y 34 Applied Biomedical Techniques has been revised by H91T 34 Applied Biomedical Techniques and finishes on 31/07/2017.	16/07/15
05	<b>Revision of Unit:</b> DH2P 35 Microbiological Techniques: Theory and Practice has been revised by H92F 35 Microbiological Techniques and finishes on 31/07/2017.	16/07/15
05	<b>Revision of Unit:</b> DP4M 34 Plant Biology has been revised by H92H 35 Plant Biology and finishes on 31/07/2017.	16/07/15
05	<b>Revision of Unit:</b> DN34 34 Physics 2 has been revised by H93E 34 Physics 2 and finishes on 31/07/2017.	16/07/15
05	<b>Revision of Unit:</b> DP5T 35 Applications of Transition Metal Compounds has been revised by H92M 35 Applications of Transition Metal Compounds and finishes on 31/07/2017.	16/07/15
05	<b>Revision of Unit:</b> DV3K 35 Biomechanics has been revised by H93C 35 Biomechanics and finishes on 31/07/2017.	16/07/15
05	<b>Revision of Unit:</b> DW8J 35 Applied Science Graded Unit 2 — Project has been revised by H91X 35 Applied Science Graded Unit 2 — Project and finishes on 31/07/2017.	16/07/15
05	<b>Revision of Unit:</b> DG71 35 Human Body Structure and Function has been revised by H92C 35 Human Body Structure and Function and finishes on 31/07/2017.	16/07/15
05	<b>Revision of Unit:</b> DG6X 35 Protein Structure and Function has been revised by H92J 35 Protein Structure and Function and finishes on 31/07/2017.	16/07/15
05	<b>Revision of Unit:</b> DN33 33 Physics 1 has been revised by H93D 33 Physics 1 and finishes on 31/07/2017.	16/07/15

Version number	Description	Date
05	<b>Revision of Unit:</b> DH55 34 Microbiology; Theory and Practice has been revised by H92G 34 Microbiology; Theory and Laboratory Skills and finishes on 31/07/2017.	16/07/15
05	<b>Revision of Unit:</b> DN8C 34 Statistics for Science 1 has been revised by H8XT 33 Statistics for Science 1 and finishes on 31/07/2017.	16/07/15
05	<b>Revision of Unit:</b> DN8D 33 Mathematics for Science 1 has been revised by H8XP 33 Mathematics for Science 1 and finishes on 31/07/2017.	16/07/15
05	<b>Revision of Unit:</b> DJ89 34 Applied Science Graded Unit 1 — Investigation has been revised by H91W 34 Applied Science Graded Unit 1 — Investigation and finishes on 31/07/2017.	16/07/15
04	<b>Revision of Unit:</b> DE1K 33 Workplace Communication in English has been revised by H8T2 33 and finishes on 31/07/2016.	16/03/15
03	<i>Ecology and Ecosystems</i> (DN37 34) and <i>Science Industries: Key Issues</i> (DP9M 34) added as optional Units to the framework.	02/10/14
02	<b>Added to framework:</b> <i>Spectroscopic and Analytical Techniques: Theory and Practice</i> FV6W 35, <i>Chemistry: Laboratory Practical Skills</i> HOPM 35, <i>Environmental Chemistry</i> DP4Y 34.	13/02/13

# 1 Introduction

This is the Arrangements document for the revised Group Award HND Applied Sciences (G86E 16) and the associated Graded Unit. The HN Units that make up the Group Award have been validated separately in accordance with the new design principles.

The Arrangements document has been developed in order to assist centres in preparing for approval for the new HND Applied Sciences Group Award and maintaining the award following successful approval. This award was validated in October 2005 and replaced the existing HND Applied Sciences awards.

This document includes details on the background to the development of the new award, its aims (both general and specific), recommended access requirements, information about the structure of the award, recommendations on delivery and assessment and other guidance for centres.

## 2 Rationale for the development of the award

The HND Applied Sciences is an existing award which underwent a National review to bring the qualification in line with new SQA design principles. The current HND award is a popular award for students who are not sure which area of science to specialise in or who do not want to specialise in one particular area of science. One of the main aims of the review process was to widen access to enable more students to undertake this qualification.

The existing HNDs Applied Science awards are already popular in some delivering centres, having enrolled well over 1,500 students in the 13 years of their existence. It is envisaged that the updated HND programme will improve students' employment and progression prospects.

The HND Applied Sciences is intended to act both as a vocational qualification to meet the workforce demands of the science industry and as an entry route to Science degrees at Scottish Universities, covering all appropriate areas of the science.

The qualification is for those who either do not want to specialise in one particular area of science, or do not know which area of science interests them.

The HND will recruit students from school leavers, adult returners and those students who have undertaken the HNC Applied Sciences and will also provide a platform, for those already in work, to gain an HN qualification on a day release basis. It is anticipated that this award will contribute to the Scottish Funding Council widening access programme.

### 2.1 Background

This development was undertaken as part of the HN Modernisation programme. A common HNC with options was developed. The HNC Applied Sciences (G7V9 15) with appropriate selection of the options then became the first year for the following suite of awards of which this HND is a component part:

- ◆ HND Applied Sciences
- ◆ HND Applied Biological Sciences
- ◆ HND Applied Chemistry

- ◆ HND Biomedical Sciences
- ◆ HND Biotechnology
- ◆ HND Environmental Sciences

The HN Science Development Groups for each award were formed in April 2004 after the HN Science conference in February 2004. The remit of each group was to take forward the HN Science review process following validation of the HNC Applied Sciences award developed by a consortium of colleges. Following on from the successful validation of the HNC Applied Sciences, the Team Leaders commenced the review of the Science HNDs.

The HND Applied Sciences award is a replacement of the several current HNDs Applied Science. The reasoning behind this was that the current HND awards had very poor uptake in some centres, which could not deliver the HND awards due to low class numbers and it was felt that there was a lot of crossover in the subjects between these awards. Experience has shown that having one HNC has proved to be very popular and all centres delivering the award have indicated an increase in student numbers. It is anticipated that similar success will be enjoyed by this award. A common national framework also makes it much easier for university admissions tutors to decide on whether or not HND applicants meet their requirements for (advanced) entry.

## **2.2 Need for the Award**

In April 2004, the HNC Applied Sciences award was validated under the new design principles. At validation the intention was stated that the HNC would form a flexible basis for the first year for suitable new HND Science awards to include recommended options for progression to specific HNDs. The majority of the current HN Science courses are approaching their lapsing period and it was considered the ideal time to rewrite HND Science courses under the SQA design guidelines including the HND Applied Sciences. The executive summary (Circular SFC/02/06) of the recent report by the Scottish Funding council supports the need for this award.

## **2.3 Articulation**

The anticipated year of entry to university varies between different HN courses in Science. Since the HNC/D Applied Biomedical Science is a specialised course there is a higher likelihood of full credit transfer on entering university. The HND Applied Sciences is a broader based course resulting in the likelihood that there may be less of an overlap of content between the HN and degree courses hence less credit transfer takes place. However, the advantage for students is that the HND Applied Sciences allows them to experience a post-school course before making a final decision on a specific university course. Students need to be made aware of these differences between the HN courses at the outset as the choices made at this stage greatly affects their progression options.



## 2.4 Target groups

The awards are designed for those who wish to take up a career in the science-based industries eg:

- (a) Students articulating from the suite of National Certificate programmes.
- (b) Students articulating from ACCESS courses.
- (c) School leavers with a minimum of one Science Higher at C grade.
- (d) Students who may have partially completed one or two years of a degree programme.

The HND Applied Sciences Group Award is a general science award which allows candidates to gain skills and knowledge in the general and biological sciences and Core Skills.

## 2.5 Open Learning

The award may be delivered by open and distance learning methods, provided that adequate preparations are made. Additional planning and resources will be needed for candidate support, assessment and laboratory work.

## 2.6 Employment opportunities

- ◆ *Futureskills Scotland* published jointly by *Highlands and Islands enterprise* and *Scottish Enterprise* make labour market projections for the years 2003-2008. These predictions are based on an economic forecasting model produced by the researchers at the universities of Warwick and Cambridge. This model forecast that within Scotland, in the periods covered, there:
  - will be 500,000 new jobs arising of which:
  - 103,000 will be in health and education
  - 5,000 will be in chemicals
  - 8,000 will be in manufacturing
  - 5,000 will be in the food, drink and tobacco industries and
- ◆ that 56% of these new jobs will require a qualification at HNC or above

This HND has been designed to meet the needs of this expanding employment market and students will develop the competences required to enhance their ability to obtain employment as a senior technician, junior laboratory manager or production process controller in Science based industries.

Typical job opportunities for students with the HND Applied Sciences are diverse and include posts in:

- ◆ industrial research and development laboratories
- ◆ quality assurance laboratories
- ◆ college, university and research institute laboratories and
- ◆ local authority laboratories

Much of contemporary industrial production involves complex hi-tech processes. Supervision and control of such processes requires the knowledge and competences incorporated in the HND Applied Sciences. Production control posts also exist in a wide range of industrial sectors including:

- ◆ chemical
- ◆ bio-medical
- ◆ pharmaceutical
- ◆ food processing
- ◆ textiles
- ◆ bio-technology
- ◆ soft drinks, brewing and distilling

Further consultation occurred at the HN Science Conferences on February 2004 and February 2005 to which all colleges in Scotland were invited. At both of these events a presentation was given by Michael Guy of the HN Science Team Leaders Development Group on the proposed structure and development of a new HND Applied Sciences. Discussion which took place in the workshops shaped the final structure of the new award, including recommended options in the HNC Applied Sciences which will form the first year of the HND award.

To support our market research, the following reports were also considered:

The latest SLIMS (Strathclyde Labour Intelligence Market Survey) report for the period 2005-2015 forecasts the following increases in jobs in areas where successful candidates might expect to find employment:

	West of Scotland	Scotland
Health sector % increase	7	6
Education sector % increase	8	8
Science professionals number	4,500	37,300
Health related professionals number	11,500	17,700
	West of Scotland	Scotland
Health sector % increase	7	6
Education sector % increase	8	8
Science professionals number	4,500	37,300
Health related professionals number	11,500	17,700

The last two rows show the number of replacement jobs arising as a result of demographic changes.

### 3 Aims of Award

#### 3.1 General aims of the HND Applied Sciences

The overall aim is to provide a progressive, integrated and coherent education which will be responsive to the needs of students, employers and higher institutions. Specifically these are to:

- ◆ **Provide a broad based qualification for candidates who** either do not want to specialise in one particular area of science, or do not know which area of science interests them the most. The HND Applied Sciences curriculum allows candidates to gain experience of several diverse areas of science thus giving them a more informed background against which to make a better decision at a later stage.
- ◆ **Develop candidates' knowledge and skills** such as planning, analysis and team working in the area of Applied Sciences.
- ◆ **Develop employment skills** and enhance candidates' employment prospects by providing the student with a wide range of practical laboratory skills including microbiological skills and assays.
- ◆ **Enable progression** within the SCQF framework to Degree level or a PDA/SVQ level 4 within the workplace as students are undertaking a wide range of transferable skills and underpinning knowledge.
- ◆ **Develop study and research skills** in the area of Applied Sciences, the evidence of which can be demonstrated throughout the award and also in the Graded Units.
- ◆ **Develop transferable skills** including Core Skills to be demonstrated across all Units including communications, numeracy, IT, working in a team and problem-solving. Candidates will also become familiar with 'soft skills' such as learning to work on their own or in a team environment as well as developing skills in producing oral and written reports and enhancing their presentation and communication skills.
- ◆ **Provide a stimulating and intellectually satisfying learning experience.** The level and content of knowledge necessary for successful completion of this award will require diligence and commitment from the student. The structure of the award, design of the assessments and the relationship between theory and observed good practice are intended to provide a balance between presented learning and developmental thinking on the part of the student.
- ◆ **Develop in the candidate skills of independent study and communication** and an informal sense of the responsibility attached to the work of scientists which should be demonstrated particularly in the Graded Units.
- ◆ **Provide the candidate with a deeper underpinning knowledge** of all areas of science.

- ◆ **Provide a flexible route to the qualification**, meeting demand, for example, for those already in employment. The unitised structure of the course and the intended modes of delivery will provide access to this qualification from those in employment through day-release provision and for other students through full-time provision.

### 3.2 Specific aims of the HND Applied Sciences

The aims of the HND Applied Sciences specifying the knowledge and skills required in order to be deemed competent in this subject area are to:

- ◆ **Prepare candidates for an appropriate level of employment**, in science areas such as research and industrial laboratories; biotechnology, chemical, microbiological, pharmaceutical, and environmental industries. This could include the following roles:
  - Senior technician in a general science laboratory
  - Production process controller
  - Supervisor of a complex hi-tech processes
- ◆ **Develop a range of contemporary vocational skills** relating to the use, support and development of systems appropriate to employment at technician or professional level.

This includes project and time management skills, risk assessment and investigative skills.

- ◆ **Develop options to allow candidates to experience a diverse range of science topics** in a variety of science areas in Units such as: microbiology, biotechnology, animal biology, cell biology, chemistry, physics, mathematics, statistics.
- ◆ **Prepare candidates for progression to further studies** in science related disciplines. This could include to a degree programme or to a Professional Development Award in a number of science disciplines.
- ◆ **Provide candidates with a wider range of practical laboratory skills** to further enhance job prospects through the practical content of the course (see number of practical hours per Unit (Section 5.1). This includes producing final laboratory reports, managing experiments, enhancing problem solving skills and appropriate Health and Safety skills in a laboratory environment.
- ◆ **Provide the candidate with a sound academic basis** in Applied Sciences.

## 4 Access to awards

### 4.1 Access requirements for the award

It is intended that admission to this course should be as broadly based as possible to widen access, but that this should be consistent with the selection of candidates who have a reasonable chance of successfully completing the course.

The following entry requirements are given as guidelines only:

- ◆ HNC Applied Sciences.
- ◆ SQA National Units and Courses in relevant areas at Higher level.
- ◆ SVQ level 3 in a relevant Science area.
- ◆ Scottish Group Award (SGA) in Science at Intermediate 2.
- ◆ At least one Intermediate 2 Science pass and not fewer than two Standard Grade 3 (minimum) passes. These three passes should be from different subjects in the following list:
  - Chemistry, Biology, Biotechnology, Biology, Human Biology, Physics, Mathematics or other appropriate science subject.
- ◆ Qualification in an appropriate Science and Maths programme, such as SWAP Access to Science.
- ◆ Other relevant qualifications or experience.
- ◆ At the discretion of the presenting centre for applicants with a different experiential background, who could benefit from taking the course or Units within the course, eg adult returners, overseas students with relevant qualifications and/or work experience.

## 4.2 Alternative Access Arrangements

The presenting centre may operate alternative access arrangements in cases where the candidate is convinced s/he already has the required competences in a given area. These arrangements are as follows:

- ◆ Assessment on demand
- ◆ Credit Transfer
- ◆ Accreditation of Prior Learning — this is done on an case by case basis and each college will have their own internal systems

Note — the term prior informal learning can also be described as prior experiential learning. It covers all prior learning which has not previously been assessed or credit-rated. This includes prior learning achieved through life and work experiences (paid and voluntary), as well as prior learning gained in non-formal contexts through community-based learning; workplace learning and training; continuing professional development and independent learning.

The types of experiences through which prior informal learning can be gained include:

- ◆ A particular piece of work, task or project undertaken at work, or through community or voluntary work, or through independent learning.
- ◆ The experience of doing a particular job (paid or voluntary), or performing a particular role, over a period of time.
- ◆ ‘On the job’ training, or being mentored.
- ◆ A non credit rated educational or training course, undertaken in a community or workplace setting.

- ◆ The experience of training, teaching or mentoring others, either formally or informally.
- ◆ Relevant Work Experience eg science industries, medical and NHS laboratories.

Individual presenting centres will outline their systems for each of these as appropriate.

Guidance for Centres in supporting candidates with additional requirements.

Candidates may be accepted onto the HND Applied Sciences course that may require additional ‘bridging’ in order to meet the requirements of the course. Colleges tend to have their own informal courses which are made up of SQA Units which are badged as an NC Group Awards. Selective offers should not be made to such students to take appropriate Units at the appropriate level concurrently with the HND Units. In addition colleges will be expected to provide additional support in terms of one to one support on a tutorial basis to enable these students to achieve their full potential. Students with additional educational, as opposed to academic, support needs (eg those with dyslexia) should be referred to the specialist support areas within the college and also advised on additional financial aid (eg the disabled students allowance).

### 4.3 Recommended Core Skills Entry Profile

The recommended Core Skills entry profile for the HND Applied Sciences is as follows:

Core Skill	Recommended SCQF Entry level
Communication	level 5
Numeracy	level 4
Information Technology	level 5
Problem Solving	level 4
Working With Others	level 4

## 5 Award structure

### 5.1 Conditions of the award

**Summary of design principles — HNDs will:**

- ◆ be at SCQF level 8 and have 240 SCQF credit points (30 HN credits)
- ◆ have a minimum of 64 SCQF credit points (8 HN credits) at level 8
- ◆ have one Graded Unit of 8 SCQF points at level 7, plus 16 SCQF credit points of Graded Units at level 8
- ◆ have a mandatory section with a minimum of 96 SCQF credit points, including the Graded Units

The substantial core (25 credits) together with the large number of options allows for a common award which can be tailored to meet the requirements of local employers and HEIs.

## 5.2 Framework

### Mandatory Units: (25 Credits)

Product title	Product code	SCQF credit value	SCQF level	SCQF credit points
Presentation Skills in Science	DG70 34	1	7	8
Information Technology Applications Software 1	D75X 34	1	7	8
Fundamental Chemistry: Theory and Practice Or Fundamental Chemistry: Theory and Laboratory Skills	DH2K 34  H92X 34	2  2	7  7	16  16
Quality and Health & Safety Systems in the Science Industries	DF82 34	1	7	8
Applied Science Graded Unit 1 — Investigation	H91W 34*	1	7	8
Mathematics for Science 1	H8XP 33*	1	6	8
Statistics for Science 1	H8XT 33*	1	7	8
Cell Biology: Theory and Practice Or Cell Biology: Theory and Laboratory Skills	DJ1K 34  H927 34	1  1	7  7	8  8
Microbiology: Theory and Laboratory Skills	H92G 34*	2	7	16
Fundamental Concepts of Organic Chemistry Or Organic Chemistry: Theory and Laboratory Skills	DP2P 34  H933 34	1  1	7  7	8  8
Fundamental Concepts of Inorganic Chemistry Or Inorganic Chemistry: Theory and Laboratory Skills	DP2N 34  H92Y 34	1  1	7  7	8  8
Fundamental Concepts of Physical Chemistry Or Physical Chemistry: Theory and Laboratory Skills	DP2R 34  H936 34	1  1	7  7	8  8
Physics 1	H93D 33*	1	6	8
Animal Biology Or Animal Biology	DP4L 34  H921 35	1  1	7  8	8  8
DNA Structure and Function	DJ6Y 34	1	7	
Protein Structure and Function	H92J 35*	1	8	8
Human Body Structure and Function	H92C 35*	2	8	16
Aromatic Chemistry Or	DP54 34	1	8	8

Aromatic Chemistry: Theory and Laboratory Skills	H92N 35	1	8	8
Transition Metal Chemistry Or Transition Metal Chemistry: Theory and Laboratory Skills	DR0E 35 H939 35	1 1	8 8	8 8
Thermodynamics and Kinetics Or Thermodynamics and Kinetics: Theory and Laboratory Skills	DP4N 35 H938 35	1	8	8
Applied Science Graded Unit 2 — Project	H91X 35*	2	8	16



**Optional Units: 5 credits required**

<b>Product title</b>	<b>Product code</b>	<b>SCQF credit value</b>	<b>SCQF level</b>	<b>SCQF credit points</b>
Biotechnology: An Introduction Or Biotechnology: An Introduction	DJ00 34 H926 34	1 1	7 7	8 8
Biomechanics	H93C 35*	1	8	8
Electrochemistry Or Electrochemistry	DP5V 35 H92T 35	1 1	8 8	8 8
Organic Stereochemistry Or Organic Stereochemistry: Theory and Laboratory Skills	DX2H 35 H934 35	1 1	8 8	8 8
Applications of Transition Metal Compounds	H92M 35*	1	8	8
Instrumental Techniques: Theory and Practice 1 Or Instrumental Techniques 1	DH54 35 H930 35	1 1	8 8	8 8
Instrumental Techniques: Theory and Practice 2 Or Instrumental Techniques 2	DH2N 35 H931 35	1 1	8 8	8 8
Physics 2	H93E 34*	1	7	8
Plant Biology	H92H 35*	1	7	8
Biochemistry: Theory and Practice Or Biochemistry: Theory and Laboratory Skills	DH2J 34 H922 34	1 1	7 7	8 8
Genetics	DP4P 34	1	7	8
DNA Molecular Techniques: Theory and Practice Or DNA Molecular Techniques	DJ6X 35 H92A 35	2 2	8 8	16 16
Microbiological Techniques	H92F 35*	2	8	16
Immunological Techniques: Theory and Practice Or Immunological Techniques	DH2L 35 H92E 35	1 1	8 8	8 8
Immunotechnology: Theory and Practice	DH2M 35	1	8	8
Employment Experience 2	D77H 35	1	8	8
Environmental Biology	D033 13	1	7	8
Medicinal Chemistry	DP4W 35	1	8	8
Applied Biochemical Techniques	H91T 34*	1	7	8
Clinical Microbiology and Epidemiology	DW8H 35	1	8	8
Fundamental Chemistry: An Introduction Or Fundamental Chemistry: An	DX29 33	1	6	8

Introduction	H92W 33	1	6	8
Main Group Inorganic Chemistry	DV9F 35	1	8	8
Or Main Group Inorganic Chemistry	H932 35	1	8	8
Spectroscopic and Analytical Techniques	H937 35*	1	8	8
Chemistry: Laboratory Practical Skills	H92R 35*	1	8	8
Environmental Chemistry: Theory and Laboratory Skills	H92V 35*	1	7	8
Ecology and Ecosystems	H93A 34*	1	7	8
Science Industry: Key Issues	DP9M 34	1	7	
Or Science Industry: Key Issues	H92K 34	1	7	8

\*Refer to History of Changes for revision changes.

### Broadening Units — maximum of 5 credits

Product title	Product code	SCQF credit value	SCQF level	SCQF credit points
Workplace communication in English	H8T2 33*	1	6	8
Personal Development Planning	DE3R 34	1	7	8
Work Role Effectiveness (2003)	DG6E 34	3	7	24
<b>OR</b>				
Work Role Effectiveness (2003)	DG6G 35	3	8	24

### 5.3 Articulation, professional recognition and credit transfer

Articulation agreements are already in place for the existing HND Applied Sciences award and the HEIs with whom these exist have made encouraging comments about the new framework and it is expected that similar agreements will be established for this revised award.

It is expected that the norm for candidates who achieve the HND Applied Science will be for progression to the second year of degree programmes with exceptional students achieving direct entry to third year on the basis of the topics and the grades of the Graded Units. Care has been taken in the design of the curriculum of these awards to ensure that topics and Units required to maintain articulation routes are included. Thus we foresee no difficulties in maintaining our existing articulation routes.

Articulation agreements are already in place for the existing HND Applied Sciences award and the HEIs with whom these exist have made encouraging comments about the new framework and it is expected that similar agreements will be established for this revised award.

Examples of support from various universities for this revised award are as follows:

HE Institution	Articulation from HND Applied Sciences
Paisley University	Third Year Bioscience
Glasgow Caledonian University	Still under discussion
University of Glasgow	Still under discussion
University of Strathclyde	Third Year of appropriate BSc (Hons) Science programmes
Robert Gordons University	Third Year BSc (Hons) Biology with Molecular Sciences Third Year of BSc (Hons) Forensic Science course
Aberdeen University	Still under discussion

These arrangements may be subject to caveats such as the grade of the Graded Unit or attending suitable bridging courses.

The new Higher National Certificate and Diploma Science Qualifications have been Nationally devised and will be delivered across Scotland. The Qualification Development Team engaged representatives from Higher Education at the early stages of development. With this initial input from the Universities we hope to ease the process of articulation to higher qualifications ensuring that we cover all necessary areas of the curriculum. It is our intention to carry out discussion and consultation with the HEIs which will lead to ‘**National Articulation Arrangements**’. So that instead of each college developing their own routes, articulation would be to a specific qualification rather than an individual college.

### Professional Recognition

No discussion have currently taken place with any professional body. This was not deemed to be an important aspect of development as the science based, non-medical careers which successful candidate will follow do not require a licence to practice.

## 5.4 Core Skills Signposting

There may be opportunities to gather evidence towards Core Skills or Core Skills Components (see Appendix 2) however there is only automatic certification as detailed below:

Core Skill	Component	HN Unit	Level	Mandatory /Optional
Communication	Oral Communication	Presentation Skills in Science	H	M
	Written Communication	Presentation Skills in Science	H	M
Numeracy	Using Graphical Information			
	Using Number			
Information Technology	Using Information Technology	Information Technology: Application Software 1	H	M
Problem Solving	Critical Thinking			
	Planning and Organising			
	Reviewing and Evaluating			
Working with Others				

## **6 Approaches to delivery and assessment**

### **6.1 Content and Context**

The HND Applied Sciences is a general science award which allows candidates to gain knowledge and transferable skills in general science subject areas. It allows a choice of options to enable the candidate to progress to their chosen employment or degree. This award is aimed at those employed, or wishing to be employed at basic technician level.

The evidence of support from employers indicates that the structure and content of the awards meets their needs.

Both awards allow candidates to progress to a range of study options in Higher Education.

### **6.2 Delivery and Assessment**

Although centres can choose what order in which to teach the Units within the awards it is recommended that Units at a lower SCQF level in a subject area are taught in advance of those at a higher level and a suggested delivery schedule is shown in Appendix 1.

The assessment strategy of the design principles to encourage a more holistic approach to assessment has been adopted in both awards. The new HN Unit specification places the emphasis on reducing assessment load for candidates and centres by devising assessments which assess the entire theory content of the Unit where appropriate, and by sampling of knowledge and/or skills carried out under closed-book conditions on a random basis to ensure the candidates do not have prior knowledge of the sample.

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

### **6.3 Re-assessment**

The way in which centres reassess candidates is integral to the way they manage the award assessment process as a whole. Re-assessment should be subject to rigorous internal moderation in exactly the same way as assessment is.

Candidates may require to be reassessed on only a part of an assessment where their evidence has been generated over a period of time and/or a discrete part of the Unit, such as an Outcome, has been assessed previously. On other occasions it may not be possible to reassess candidates on parts of their performance which are unsatisfactory. Situations where candidates may have to re-do a whole assessment include:

- ◆ assessments which test knowledge and understanding and where it may not be possible to extract some of the items for re-assessment purposes
- ◆ where parts of several Outcomes are involved
- ◆ where a project has been designed as an integral assessment and where there is a requirement to complete the project as a single complex task

### 6.3.1 Re-assessment Opportunities

Re-assessment should operate in accordance with a centre's assessment policy and the professional judgement of the assessor. SQA advises that there should normally be one, or in exceptional circumstances two re-assessment opportunities. Please refer to the SQA publication *Guide to Assessment and Quality Assurance for Colleges of Further Education, August 2003 revision*

### 6.3.2 Developing Alternative Assessments

The design of original assessments should inform the re-assessment process to a large extent, as the original determines the type of assessment instruments used and the purpose of the assessment. It is normal practice for centres to build up a bank of assessments which can be used in whole or in part for re-assessment purposes.

Assessment writers should always refer to the Unit specification when developing an alternative assessment to ensure that it is of equal demand to the original assessment and that it covers all the necessary criteria. Where candidates have not provided satisfactory evidence for knowledge and/or skills items which have been sampled, they should be reassessed on a different sample.

## 6.4 Practical laboratory hours – HND Applied Sciences

### Mandatory Units: (25 Credits)

Product title	Product code	SCQF credit value	Lab hours %
Presentation Skills in Science	DG70 34	1	0
Information Technology Applications Software 1	D75X 34	1	0
Fundamental Chemistry: Theory and Practice	DH2K 34	2	30
Quality and Health & Safety Systems in the Science Industries	DF82 34	1	10
Applied Science Graded Unit 1 — Investigation	H91W 34*	1	0
Mathematics for Science 1	H8XP 33*	1	0
Statistics for Science 1	H8XT 33*	1	0
Cell Biology: Theory and Practice	DJ1K 34	1	25
Microbiology; Theory and Laboratory Skills	H92G 34*	2	25
Fundamental Concepts of Organic Chemistry	DP2P 34	1	25
Fundamental Concepts of Inorganic Chemistry	DP2N 34	1	25
Fundamental Concepts of Physical Chemistry	DP2R 34	1	25
Physics 1	H93D 33*	1	25
Animal Biology 1	DP4L 34	1	25
DNA Structure and Function	DJ6Y 34	1	0
Protein Structure and Function	H92J 35*	1	10
Human Body Structure and Function	H92C 35*	2	25
Aromatic Chemistry	DP54 34	1	25
Transition Metal Chemistry	DR0E 35	1	25
Thermodynamics and Kinetics	DP4N 35	1	25
Applied Science Graded Unit 2 — Project	H91X 35*	2	40

**Optional Units: 5 credits required**

<b>Product title</b>	<b>Product code</b>	<b>SCQF credit value</b>	<b>Lab hours %</b>	<b>Recommended year to be taught</b>
Biotechnology: An Introduction	DJ00 34	1	20	Year 2
Biomechanics	H93C 35*	1	20	Year 2
Electrochemistry	DP5V 35	1	25	Year 2
Organic Stereochemistry	DX2H 35	1	25	Year 2
Applications of Transition Metal Compounds	H92M 35*	1	25	Year 2
Instrumental Techniques 1: Theory and Practice	DH54 35	1	20	Year 2
Instrumental Techniques 2: Theory and Practice	DH2N 35	1	20	Year 2
Physics 2	H93E 34*	1	25	Year 2
Plant Biology	H92H 35*	1	20	Year 2
Biochemistry: Theory and Practice	DH2J 34	1	0	Year 2
Genetics	DP4P 34	1	25	Year 2
DNA and Molecular Techniques: Theory and Practice	DJ6X 35	2	20	Year 2
Microbiological Techniques	H92F 35*	2	20	Year 2
Immunological Techniques: Theory and Practice	DH2L 35	1	20	Year 2
Immunotechnology: Theory and Practice	DH2M 35	1	20	Year 2
Employment Experience 2	D77H 35	1	50	Year 2
Environmental Biology	D033 13	1	10	Year 2
Medicinal Chemistry	DP4W 35	1	10	Year 2
Applied Biochemical Techniques	DG6Y 34	1	25	Year 2
Clinical Microbiology and Epidemiology	DW8H 35	1	20	Year 2
Fundamental Chemistry: An Introduction	DX29 33	1	0	Year 1
Main Group Inorganic Chemistry	DV9F 35	1	10	Year 2
Spectroscopic and Analytical Techniques	H937 35*	1		
Chemistry: Laboratory Practical Skills	H92R 35*	1		
Environmental Chemistry: Theory and Laboratory Skills	H92V 35*	1		

\*Refer to History of Changes for revision changes.

## Broadening Units — maximum of 5 credits

Product title	Product code	SCQF credit value	Lab hours %
Workplace Communication in English	H8T2 33*	1	0
Personal Development Planning	DE3R 34	1	
Work Role Effectiveness (2003) or	DG6E 34	3	0
Work Role Effectiveness (2003)	DG6G 35	3	0

## 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](http://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* ([www.sqa.org.uk](http://www.sqa.org.uk)).

### Open and Distance Learning

HND Applied Sciences could be delivered by Open Learning. Candidates would have to attend the presenting centre or other agreed institution to complete the practical assessments. Centre-devised supervision agreement should detail controlled conditions to ensure authenticity of evidence.

### Credit Transfer Transition Arrangements

In principle, candidates can be given credit transfer between current HNC/D Units and new HN Units. Details of these arrangements are available from SQA and in the Validation panel members' guide, Section 5.7.

Given that there are several different HNC/D Science awards currently being delivered containing varying HN descriptors, mapping Units and awards for credit transfer should be done on an individual basis for those candidates seeking 2nd year entry in the future.

However, it is recommended that current candidates complete the 2nd year of current HND Science awards.



This programme has been designed to meet the needs of this expanding employment market and you will develop the competences required to enhance your ability to obtain employment as a senior technician, junior laboratory manager or production process controller in Science based industries.

## 8 General information for candidates

Centres should provide candidates with a brief summary of the Group Award before they commence on their course of study. It should include information on what the Group Award is about, and provide information on the knowledge and skills which will be developed, what is involved in assessment and, in particular, the Graded Units, Core Skills, and the conditions of the award.

This would normally be presented as part of the information in a course handbook and should include information on the possible routes of progression in education or types of employment available for candidates obtaining the qualification. Information can be found in the following sections of this document: course content (5.1), access arrangements (4.1 and 4.2), articulation routes (2.6), employment opportunities (3.2).

As mentioned earlier in this document the HND Environmental Sciences is intended to act both as a vocational award and as an entry route to degree courses.

Product title	Product code	SCQF credit value	Lab hours %
Presentation Skills in Science	DG70 34	1	0
Information Technology Applications Software 1	D75X 34	1	0
Fundamental Chemistry: Theory and Practice	DH2K 34	2	30
Quality and Health & Safety Systems in the Science Industries	DF82 34	1	10
Applied Science Graded Unit 1 — Investigation	H91W 34*	1	0
Mathematics for Science 1	H8XP 33*	1	0
Statistics for Science 1	H8XT 33*	1	0
Cell Biology: Theory and Practice	DJ1K 34	1	25
Microbiology; Theory and Laboratory Skills	H92G 34*	2	25
Fundamental Concepts of Organic Chemistry	DP2P 34	1	25
Fundamental Concepts of Inorganic Chemistry	DP2N 34	1	25
Fundamental Concepts of Physical Chemistry	DP2R 34	1	25
Physics 1	H93D 33*	1	25
Animal Biology 1	DP4L 34	1	25
DNA Structure and Function	DJ6Y 34	1	0
Protein Structure and Function	H92J 35*	1	
Human Body Structure and Function	H92C 35*	2	25
Aromatic Chemistry	DP54 34	1	25
Transition Metal Chemistry	DR0E 35	1	25
Thermodynamics and Kinetics	DP4N 35	1	25
Applied Science Graded Unit 2 — Project	H91X 35*	2	40

**Optional Units: 5 credits required**

<b>Product title</b>	<b>Product code</b>	<b>SCQF credit value</b>	<b>Lab hours %</b>	<b>Recommended year to be taught</b>
Biotechnology: An Introduction	DJ00 34	1	20	Year 2
Biomechanics	H93C 35*	1	20	Year 2
Electrochemistry	DP5V 35	1	25	Year 2
Organic Stereochemistry	DX2H 35	1	25	Year 2
Applications of Transition Metal Compounds	H92M 35*	1	25	Year 2
Instrumental Techniques 1: Theory and Practice	DH54 35	1	20	Year 2
Instrumental Techniques 2: Theory and Practice	DH2N 35	1	20	Year 2
Physics 2	H93E 34*	1	25	Year 2
Plant Biology	H92H 35*	1	20	Year 2
Biochemistry: Theory and Practice	DH2J 34	1	0	Year 2
Genetics	DP4P 34	1	25	Year 2
DNA and Molecular Techniques: Theory and Practice	DJ6X 35	2	20	Year 2
Microbiological Techniques	H92F 35*	2	20	Year 2
Immunological Techniques: Theory and Practice	DH2L 35	1	20	Year 2
Immunotechnology: Theory and Practice	DH2M 35	1	20	Year 2
Employment Experience 2	D77H 35	1	50	Year 2
Environmental Biology	D033 13	1	10	Year 2
Medicinal Chemistry	DP4W 35			Year 2
Fundamental Chemistry: An Introduction	DX29 33	1	0	Year 1
Main Group Inorganic Chemistry	DV9F 35	1	10	Year 2
Applied Biochemical Techniques	DG6Y 34	1	25	Year 2
Clinical Microbiology and Epidemiology	DW8H 35	1	20	Year 2
Spectroscopic and Analytical Techniques	H937 35*	1		
Chemistry: Laboratory Practical Skills	H92R 35*	1		
Environmental Chemistry: Theory and Laboratory Skills	H92V 35*	1		

\*Refer to History of Changes for revision changes.

## Broadening Units — maximum of 5 credits

Product title	Product code	SCQF credit value	Lab hours %
Workplace Communication in English	H8T2 33*	1	
Personal Development Planning	DE3R 34	1	0
Work Role Effectiveness (2003) or	DG6E 34	3	0
Work Role Effectiveness (2003)	DG6G 35	3	0

## 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](http://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 Information

Appendix 2: Timetabling of Mandatory Units

Appendix 3: Core Skill Grids

See following pages for Appendices.

**Mapping Information**

## Mapping information

### Specific aims of the HND Applied Sciences

Specific aims	Prepare candidates for an appropriate level of employment	Develop a range of contemporary vocational skills	Develop options to permit an element of vocational specialisation	Prepare candidates for progression to further studies	Provide a flexible route to a qualification	Provide the student with a sound academic basis	Provide candidates with a wider range of practical laboratory skills
Unit title							
Presentation Skills in Science	√	√	√	√	√	√	
ITA Software 1	√	√	√	√	√	√	
Fundamental Chemistry: T&P	√	√	√	√	√	√	√
Quality and H&S Systems in Science Industries	√	√		√		√	
Graded Unit 1	√	√	√	√	√	√	
Statistics for Science 1	√			√		√	
Cell Biology: T&P	√	√		√	√	√	√
DNA Structure and Function	√	√	√	√	√	√	√
Microbiology: T&L	√	√	√	√	√	√	√
Mathematics for Science 1	√			√		√	
Fundamental concepts of organic chemistry		√	√	√	√	√	√

<b>Specific aims</b>	<b>Prepare candidates for an appropriate level of employment</b>	<b>Develop a range of contemporary vocational skills</b>	<b>Develop options to permit an element of vocational specialisation</b>	<b>Prepare candidates for progression to further studies</b>	<b>Provide a flexible route to a qualification</b>	<b>Provide the student with a sound academic basis</b>	<b>Provide candidates with a wider range of practical laboratory skills</b>
<b>Fundamental concepts of inorganic chemistry</b>		√	√	√	√	√	√
<b>Fundamental concepts of physical chemistry</b>		√	√	√	√	√	√
<b>Human Body Structure and Function</b>	√	√	√	√	√	√	√
<b>Animal Biology</b>	√	√	√	√	√	√	√
<b>Graded Unit 2</b>	√	√	√	√	√	√	√
<b>Protein Structure &amp; Function</b>	√	√	√	√	√	√	√
<b>Physics 1</b>		√		√		√	
<b>Aromatic chemistry</b>	√	√	√	√	√	√	√
<b>Thermodynamics and Kinetics</b>	√	√	√	√	√	√	√
<b>Transition metal chemistry</b>	√	√	√	√	√	√	√

**Credit Transfer**



## Credit Transfer

In principle, candidates can be given credit transfer between current HNC/D Units and new HN Units. Details of these arrangements are available from SQA and in the Validation panel members' guide, Section 5.7.

Given that there are several different HNC/D Science awards currently being delivered containing varying HN descriptors, mapping Units and awards for credit transfer should be done on an individual basis for those candidates seeking 2<sup>nd</sup> year entry in the future.

However, it is recommended that current candidates complete the 2<sup>nd</sup> year of current HND Science awards if they are still available.

## Credit Transfer Arrangements

### Alternative route for candidates transferring from old HNC/D Applied Science awards (G601 15, G1EN 15, G1E8 15 or G1ED 15) to new HND Applied Sciences Award

New Unit	Credit value	Core/Option	Old Unit	Credit value	Core/Option	Old Outcomes covering new Unit	Outcomes in new Unit not covered
Presentation Skills in Science DG70 34	1	C	Communications Selecting and presenting complex information D5CM 04	1	C	3	1, 2, 3
Statistics for Science	1	C/O	Sampling and descriptive statistics A63M04	0.5	C	2	1
Information Technology: Applications Software 1 D75X 34	1	C	Information Technology Applications 1 A6AM 04	1	C	all	None
Fundamental Chemistry: Theory and Practice DH2K 34	2	C	Concepts in Inorganic and Organic Chemistry D64R 04 Concepts in Physical Chemistry A6LG 04 Laboratory Practice Chemistry D64T 04	1.5 1	C	1 (part) 1 (part) 1,2	1 (reaction mechanisms)
Quality and Health & Safety in Science Industries DF82 34	1	C	Laboratory Practice: Health and Safety in the Laboratory D64W 04	0.5	C	1 (part)	2,3
Graded Unit 1 — Investigation	1	C	None				all
Cell Biology: Theory and	1	C/O	Cell Biology	1	C	1, 2, 3 (part)	3 (microscopes

New Unit	Credit value	Core/Option	Old Unit	Credit value	Core/Option	Old Outcomes covering new Unit	Outcomes in new Unit not covered
Practice DJ1K 34			A6JY 04				other than oil immersion). 4
DNA: Structure and Function DJ6Y 34	1	O	Introduction to Genetics A6K2 04	1	C	1,4	2, 3, 5
Microbiology: Theory and Laboratory Skills H92G 34	2	C	None				
Maths for Science 1	1	C/O	Maths for Science 1 A5N204	1	C	All	None
Physics 1	1	C/O	Laboratory Practice: Physics D64V04	1	C	1, 2	1, 2, 3
Fundamental Concepts of Organic Chemistry	1	O	Concepts in Inorganic and Organic Chemistry D64R04	1.5	C	3, 4, 5	2 (other than addition)
			Laboratory Practice Chemistry D64T04	1	C	1, 2	
Fundamental Concepts of Physical Chemistry	1	O	Concepts in Physical Chemistry A6LG04	1	C	1	{None {
			Laboratory Practice Chemistry D64T04	1	C	1, 2	
Fundamental Concepts of Inorganic Chemistry	1	O	Concepts in Inorganic and Organic Chemistry D64R04	1.5	C	1 (part)	1 (electron transfer processes)
			Laboratory Practice Chemistry D64T04	1	C	1, 2	

**Timetabling of Mandatory Units**

## Guidelines for timetabling of Mandatory Units

Please note that this list of credit equivalences is not exhaustive nor do credit values always match where a credit equivalent is quoted.

### HNC Applied Sciences — Applied Sciences option (year 1 of HND)

#### Two Block timetable

<b>Block 1</b>	Fundamental Chemistry (2 credit)  C	Quality H&S  C	Presentation Skills  C	Cell Biology: Theory and Practice  C	Information Technology  C	Statistics for Science  C/O	Earth Science  C
<b>Block 2</b>	Maths for Science  C	Microbiology: Theory and Practice  C	Fundamental Concepts of Organic Chem	Fundamental Concepts of Inorganic Chem	Applied Science Graded Unit  C		Option 1

**Core Skills Grids**

## Core Skills Profile

### HND Applied Sciences

Units	Core Skills				
	Numeracy	Communication	Information Technology	Problem Solving	Working with others
Statistics for Science 1	✓ Higher				
Presentation Skills in Science		✓ Embedded Higher			
Information Technology: Applications Software 1			✓ Embedded Higher		
Quality and Health & Safety Systems in Science Industries		✓ Higher			✓ Intermediate 2
Fundamental Chemistry: Theory and Practice	✓ Higher	✓ Higher		✓ Higher	
Cell Biology: Theory and Practice		✓ Higher			
Human Body Structure and Function	✓ Higher	✓ Higher			
DNA Structure and Function		✓ Higher			
Microbiology: Theory and Laboratory Skills	✓ Higher	✓ Higher			
HNC Graded Unit		✓ Higher		✓ Higher	
HND Graded Unit		✓ Higher		✓ Higher	
Animal Biology 1					
Protein Structure and Function		✓ Higher			✓ Intermediate 2
Mathematics for Science 1	✓ Higher			✓ Higher	
Fundamental concepts of inorganic chemistry	✓ Higher			✓ Higher	
Fundamental concepts of organic chemistry				✓ Higher	
Fundamental concepts of physical chemistry				✓ Higher	
Physics 1	✓ Higher			✓ Higher	
Aromatic Chemistry		✓ Higher		✓ Higher	
Thermodynamics and Kinetics			✓ Higher		
Transition metal chemistry OR Applications of Transition metal compounds					

## Communication (Higher)

### Skill component Written Communication (Reading)

#### Read and Understand complex written communication

- a Identify and summarise all significant information, ideas and supporting details in a complex written environment.
- b Evaluate fully the effectiveness of a communication in meeting its purpose and needs of its intended readership.

Unit	Knowledge and Skills/Evidence	Developed/ Assessed	a	b
Presentation Skills in Science	Embedded	Assessed	√	√
Quality and Health & Safety in Science Industry	Outcome 1 and 2	Developed	√	√
Fundamental Chemistry: Theory and Practice	Outcome 1	Developed	√	√
Cell Biology: Theory and Practice	Outcomes 1, 2 and 4	Developed	√	√
DNA Structure and Function	Outcomes 1-5	Developed	√	√
Microbiology: Theory and Laboratory Skills	Outcomes 1-3	Developed	√	√
Human Body Structure and Function	Outcomes 1-6	Developed	√	√
Protein Structure and Function	Outcomes 1-4	Developed	√	√
Aromatic Chemistry	Outcomes 1-3	Developed	√	

## Written Communication (Writing)

### Produce well-structured Written Communication on complex topics

- a Present all essential ideas/information and supporting detail in a logical and effective order.
- b Use a structure which takes account of purpose and audience and links major and minor points in ways which assist the clarity and impact of the writing.
- c Use conventions which are effective in achieving the purpose and adapted as necessary for the target audience.
- d Use spelling, punctuation and sentence structures which are consistently accurate.
- e Vary sentence structure, paragraphing and vocabulary to suit the purpose and target audience.

Unit	Knowledge/Skills/Evidence	Developed/ assessed	a	b	c	d	e
Presentation Skills in Science	Embedded	Assessed	√	√	√	√	√
Quality and Health & Safety in Science Industry	Outcome 3	Developed	√	√	√	√	√
Fundamental Chemistry: Theory and Practice	Outcomes 1 and 2	Developed	√	√	√		
Cell Biology: Theory and Practice	Outcomes 1,2 and 4	Developed	√	√	√		
DNA Structure and Function	Outcomes 1-5	Developed	√	√	√		
Microbiology: Theory and Laboratory Skills	Outcomes 1-4	Developed	√	√	√		
Human Body Structure and Function	Outcomes 1-6	Developed	√	√	√	√	√
Protein Structure and Function	Outcomes 1-4	Developed	√	√	√		
HNC Graded Unit	Unit	Developed	√	√	√	√	√
HND Graded Unit	Unit	Developed	√	√	√	√	√
Aromatic Chemistry	Outcomes 1-3	Developed	√			√	



## Oral Communication

### Produce and respond to oral Communication on a complex topic

- a Use vocabulary and a range of spoken language structures consistently and effectively at an appropriate level of formality.
- b Convey all essential information, opinions or ideas with supporting detail accurately and coherently and with varied emphasis as appropriate.
- c Structure communication to take full account of purpose and audience.
- d Take account of situation and audience during delivery.
- e Respond to others, taking account of their contributions.

Unit	Knowledge/Skills/Evidence	Developed/ Assessed	a	b	c	d	e
Presentation Skills in Science	Embedded	Assessed	√	√	√	√	√

### Using Information Technology (Higher)

#### Use an IT system independently to process a range of information

- a Use a range of IT equipment paying attention to security and other users.
- b Resolve one simple hardware or software problem.
- c Use software in an unfamiliar context requiring some analysis and design, integration of data decision on output format.
- d Carry out two searches to extract and present information from electronic data sources.

Unit	Knowledge/Skills/Evidence	Developed/ Assessed	a	b	c	d
Information Technology: Applications Software 1	Embedded in Unit	Assessed	√	√	√	√
Thermodynamics and Kinetics	Unit	Developed			√	

## Numeracy (Higher)

### Skill component Using Number

#### Apply a wide range of numerical skills

- a Work confidently with a numerical or statistical concept.
- b Decide on the steps and operations to be carried out.
- c Carry out a number of sustained, complex calculations.

Unit	Knowledge/Skills/Evidence	Developed/ Assessed	a	b	c
Statistics for Science 1	Outcomes 1 and 2	Developed	√	√	√
Fundamental Chemistry: Theory and Practice	Outcomes 1 and 2	Developed	√	√	√
Microbiology: Theory and Laboratory Skills	Outcomes 2, 3 and 4	Developed	√	√	√
Mathematics for Science 1	Unit	Developed	√	√	√
Fundamental concepts of inorganic chemistry	Outcome 3	Developed			√
Physics 1	Unit	Developed	√		√
Human Body Structure and Function	Outcome 3, 4 and 6	Developed	√	√	√

## Numeracy (Higher)

### Skill component Using graphical information

#### Interpret and communicate graphical information in everyday and generalised contexts

- a Analyse and interpret complex graphical information.
- b Select an appropriate form of table, graph, chart, diagram or qualitative form and communicate information in that form.

Unit	Knowledge/Skills/Evidence	Developed/ assessed	a	b
Statistics for Science 1	Outcomes 1 and 2	Developed	√	√
Fundamental Chemistry: Theory and Practice	Outcomes 1 and 2	Developed	√	√
Microbiology: Theory and Laboratory Skills	Outcomes 2, 3 and 4	Developed	√	√
Physics 1	Outcome 1 and 2	Developed	√	
Human Body Structure and Function	Outcome 4 and 6	Developed	√	√

## Numeracy (Higher)

### Skill component Using Number

Apply in combination a wide range of numerical/statistical and other mathematical skills to process complex information

- a Work confidently with a numerical or statistical concept.
- b Decide on the steps and operations to be carried out.
- c Carry out a number of sustained, complex calculations.

Unit	Knowledge/Skills/Evidence	Developed/ assessed	a	b	c
Statistics for Science 1	Outcomes 1 and 2	Developed	√	√	√
Fundamental Chemistry: Theory and Practice	Outcomes 1 and 2	Developed	√	√	
Microbiology: Theory and Laboratory Skills	Outcomes 2, 3 and 4	Developed	√	√	√

## Problem Solving (Higher)

### Skill components Critical Thinking

#### Analyse a complex situation or issue

- a Identify the factors involved in the situation or issue.
- b Assess the relevance of these factors to the situation or issue.
- c Develop and justify an approach to deal with the situation or issue.

Unit	Knowledge/Skills/Evidence	Developed/ assessed	a	b	c
Fundamental Chemistry: Theory and Practice	Outcomes 1 and 2	Developed	√	√	√
Protein Structure and Function	Outcomes 1-4	Developed	√	√	√
HNC Graded Unit	Unit	Developed	√	√	
HND Graded Unit	Unit	Developed	√	√	
Fundamental concepts of inorganic chemistry	Outcome 1– 2	Developed	√	√	
Fundamental concepts of organic chemistry	Outcome 1-2	Developed	√	√	
Fundamental concepts of physical chemistry	Outcome 1-2	Developed	√	√	
Physics 1	Outcomes 1-3	Developed	√	√	

## Problem Solving (Higher)

### Skill components Planning and Organising

#### Plan, organise and complete a very simple, familiar task

- a Identify some very simple steps in the plan.
- b Select appropriate resources to carry out the plan.
- c Carry out the task.

Unit	Knowledge/Skills/Evidence	Developed/ assessed	a	b	c
Fundamental Chemistry: Theory and Practice	Outcome 2	Developed	√	√	√
Protein Structure and Function	Outcome 4	Developed	√	√	√
HNC Graded Unit	Unit	Developed	√	√	√
HND Graded Unit	Unit	Developed	√	√	√
Fundamental concepts of inorganic chemistry	Outcome 1– 2	Developed	√	√	√
Fundamental concepts of organic chemistry	Outcome 1– 2	Developed	√	√	√
Fundamental concepts of physical chemistry	Outcome 1- 2	Developed	√	√	√
Physics 1	Outcome 1-3	Developed	√	√	√

## Problem Solving (Higher)

### Skill components Reviewing and Evaluating

#### Review and evaluate a complex problem solving activity

- a Evaluate the effectiveness of the strategy/strategies.
- b Identify and gather appropriate evidence.
- c Draw conclusions and make recommendations.

Unit	Knowledge/Skills/Evidence	Developed/ assessed	a	b	c
Fundamental Chemistry: Theory and Practice	Outcome 3	Developed	√	√	√
HNC Graded Unit	Unit	Developed		√	√
HND Graded Unit	Unit	Developed		√	√
Fundamental concepts of inorganic chemistry	Outcome 1-2	Developed		√	√
Fundamental concepts of organic chemistry	Outcome 1-2	Developed		√	√
Fundamental concepts of physical chemistry	Outcome 1-2	Developed		√	√
Physics 1	Outcome 1-3	Developed		√	√



## Working with Others (Intermediate 2)

### Work with Others in a group to analyse, plan and complete an activity

- a Analyse the activity and identify the component tasks and roles which make up the activity.
- b Agree allocation of responsibilities taking account of own strengths and weaknesses and those of others.
- c Support co-operative working.
- d Evaluate and draw a conclusion about own contribution to group activity, and justify this by referring to supporting evidence.

Unit	Knowledge/Skills/Evidence	Developed/ Assessed	a	b	c	d	e
Quality and Health & Safety Systems in Science Industries	Outcome 3	Developed	√	√	√		
Protein Structure and Function	Outcome 4	Developed	√	√	√		