



# **Arrangements Document**

**HND Biomedical Sciences (G7YX 16)**

**Validated: April 2005**

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HND BIOMEDICAL SCIENCES  
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## CONTENTS

	<b>Page</b>
<b>1 Introduction</b> .....	1
<b>2 Rationale for the Qualifications</b> .....	2
2.1 HN Science Frameworks .....	2
2.2 Consultation process .....	3
<b>3 Aims of the Award</b> .....	5
3.1 General aims of the HND Biomedical Sciences .....	5
3.2 Specific aims of the HND Biomedical Sciences .....	5
3.3 Target audience .....	6
3.4 Progression routes .....	7
3.5 The Scottish Credit and Qualifications Framework .....	8
3.6 Employment opportunities .....	8
<b>4 Access to the Award</b> .....	9
4.1 Access requirements for the award .....	9
4.2 Alternative access arrangements .....	9
<b>5 Structure of the Award</b> .....	10
5.1 HND Biomedical Sciences .....	10
5.2 Graded Units .....	11
5.3 Core Skills .....	12
5.4 Conditions of the award .....	13
5.5 SCQF levels .....	13
<b>6 Approaches to Delivery and Assessment</b> .....	14
6.1 Content and context .....	14
6.2 Delivery and assessment .....	14
6.3 Reassessment .....	16
6.4 Relationship to other awards .....	17
<b>7 Guidance for Centres</b> .....	18
7.1 Assessment moderation .....	18
7.2 Open and distance learning .....	18
7.3 Special needs .....	18
7.4 Credit transfer transition arrangements .....	18
7.5 General information for candidates .....	19
<b>8 History of Changes</b> .....	20
<b>Appendices</b>	
Appendix 1: Core Skills profile .....	23
Appendix 2: Guidelines for timetabling of mandatory Units .....	36
Appendix 3: Credit transfer .....	38
Appendix 4: HN Aims tables .....	41

# 1 Introduction

This is the arrangements document for the revised Group Award: HND Biomedical Sciences and the associated Graded Units. The HN Units which make up this Group Award have been validated separately in accordance with the new design guidelines.

The arrangements document has been written to assist centres in preparing for approval for this award and delivering the award following successful approval.

The award was developed under the new SQA HN Design Guidelines, validated in April 2005 and replaces any existing HND Biomedical Sciences awards.

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

The award title, HND Biomedical Sciences, reflects the scientific nature of the award in terms of the general approach to developing good investigative and problem solving skills.

The term 'Biomedical Sciences' expresses the synthesis of both a broad-based science and a specific biomedical perspective in which the scientific skills are embedded.

## **2 Rationale for the Qualifications**

### **2.1 HN Science Frameworks**

In April 2004, the HNC Applied Sciences and HND Biotechnology awards were validated under the new design guidelines. At validation the intention was stated that the HNC would form a flexible basis for the 1st year for suitable new HND Science awards to include recommended options for progression to specific HNDs. Most of the current HN Science courses were approaching their lapsing period and it was considered the ideal time to rewrite HND Science courses under the SQA design guidelines including the HND Biomedical Sciences.

The HN Science Team Leaders Development Group was formed in April 2004 after the HN Science conference in February 2004 in order to take forward the HN Science review process following successful validation of the HNC Applied Sciences and HND Biotechnology awards developed by a consortium of colleges.

It was agreed by centres that it was desirable to have a National Award at HNC level which would articulate to a majority of HND awards. It was also agreed to use the newly validated HNC Applied Sciences as the common starting point for the new HNDs. It was proposed that the HND development teams would aim to develop a generic, broad-based HNC Applied Sciences which could be used as an award in its own right and as an exit award for the following HNDs:

- ◆ Applied Sciences
- ◆ Applied Biological Sciences
- ◆ Applied Chemistry
- ◆ Biomedical Sciences
- ◆ Biotechnology
- ◆ Environmental Sciences

The HND Biomedical Science Development Team was formed in May 2004 from staff members in colleges already delivering the current HNC/D Biomedical Sciences awards.

The review has provided an opportunity for inclusion of up-to-date technical content, revised assessment strategies, flexibility to match current employment needs and more appropriate recognition of the needs of candidates progressing to Higher Education Institutions.

## 2.2 Consultation process

Extensive consultation was carried out at all stages of the review process to ascertain both the level of uptake of the awards as well as the relevance of the framework and Units.

This consultation involved:

- ◆ Colleges
- ◆ Employers
- ◆ Candidates
- ◆ Higher Education Institutions to which successful candidates could articulate

In reviewing these awards, consultation was undertaken at key stages in the development schedule. Development Teams and the Team Leaders of each group helped to guide the overall development process.

<b>Stakeholder</b>	<b>Method of consultation</b>
Employers	<ul style="list-style-type: none"><li>◆ Questionnaire to gather feedback on award content and structure</li><li>◆ Face-to-face interviews</li><li>◆ Telephone interviews</li></ul>
Higher Education Institutions	<ul style="list-style-type: none"><li>◆ Questionnaire</li><li>◆ Face-to-face interviews</li></ul>
Centres	<ul style="list-style-type: none"><li>◆ All delivering centres invited onto development teams</li><li>◆ Questionnaire sent to all centres</li><li>◆ HN Science conference held in January 2003 and February 2004 to update and inform centres and gather further feedback</li><li>◆ Information updates posted on SQA website on HN Science pages</li></ul>
Candidates	<ul style="list-style-type: none"><li>◆ Questionnaires to gather views of existing candidates on structure, content and assessment</li></ul>

All colleges were contacted and asked to complete a questionnaire with the aim of collating information as to the appropriate curriculum areas for an updated HND Biomedical Sciences framework, the Core Skills required, and the potential for employment/progression for graduates with the qualification. Comments made were taken into consideration when reviewing the final structure of the awards. The demand for Core Skills by industry was supported by the results. Recent adverts for jobs in Glasgow include requests for applicants with HNC/D Science qualifications.

### **2.2.1 Consultation feedback**

The consultation confirmed that there was considerable demand for the proposed awards from colleges, candidates, employers and Higher Education Institutions. Through consultation, a number of changes were made to the frameworks. Taking into account the planned review of all HN Science programmes it was agreed that a generic, flexible HNC Applied Sciences award to be used as a year 1 programme for a number of HND Science programmes was the preferred option.

### **2.2.2 Demand for revised courses**

HN Science programmes have a history of being devised by centres for local needs or by small consortiums to meet national needs. This has led to a wide portfolio of similar courses and Units. During consultation at the HN Science conference in January 2003, it was recognised that the review process should streamline Units and courses to develop a number of HND Science awards, the majority of which would have a common HNC/HND year 1. This was endorsed at the 2004 conference after which development teams were set up for five revised HND programmes.

The need for the HNC/D Group Awards has been clearly identified. These Group Awards contribute to an overall strategy for reducing the skills gap in the Science industry and enhancing the Scottish economy by further expansion of science knowledge. The evidence of support from employers, professional bodies and universities indicates that the structure and content of the awards meet the need identified.

As a result of the findings, the new HND Biomedical Sciences framework was designed which met the needs of all stakeholders. The new framework reflects the new design guidelines of 30 credits for the HND award, with a mandatory core of 27 credits. The development team agreed that the mandatory core reflected the specialised nature of the award. Option credits could be drawn from the range of new HN Science Units to reflect local expertise and specialisms.

### 3 Aims of the Award

#### 3.1 General aims of the HND Biomedical 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:

- ◆ **develop candidates' knowledge and skills** such as planning, analysis and synthesising in the area of biomedical science.
- ◆ **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. 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.
- ◆ **enable progression** within the SCQF framework to HE level or a PDA/SVQ 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 biomedical science the use of which to be demonstrated in the Graded Units.
- ◆ **develop transferable skills** including Core Skills to be demonstrated across all Units including IT skills, statistics, presentation skills, working in a team and problem-solving.
- ◆ **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 biomedical scientists which should be demonstrated particularly in Graded Unit 2.
- ◆ **provide the candidate with a deeper underpinning knowledge** in biomedical science.

#### 3.2 Specific aims of the HND Biomedical Sciences

The aims of the HND Biomedical Sciences specifying the knowledge and skills required in order to be deemed competent in this subject/occupational 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, and in particular NHS biomedical laboratories.



- ◆ **develop a range of contemporary vocational skills** relating to the use, support and development of systems appropriate to employment at technician or professional level.
- ◆ **develop options to permit an element of vocational specialisation** in a variety of biomedical science areas in Units such as; biomedical pathology, biomedical investigations, immunology, microbiology, medicinal chemistry, biotechnology, therapeutics and diagnostics.
- ◆ **prepare candidates for progression to further studies** in science related disciplines and in particular accredited biomedical sciences degree courses.
- ◆ **provide a flexible route to a qualification**, meeting demand, for example, for those already in employment. The unitised structure of the course and the intended modes of delivery may provide access to this qualification from those in employment through day-release provision and for direct entry or seconded students through full-time provision. Discrete Units will be available for study.
- ◆ **provide the student with a sound academic basis** for the continuing development of practical and conceptual skills. The course will do this by giving the student the necessary competences to deal with a variety of biomedical science areas, such as clinical chemistry, cytology, haematology, histology, immunology, microbiology/bacteriology, transfusion science, virology.
- ◆ **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 6.2.1).

### 3.3 Target audience

The existing HN Biomedical Sciences programmes are already popular in the delivering colleges, and it is envisaged that the updated HND programme will improve students' employment and progression prospects.

The HND Biomedical 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, particularly Health Professional Council (HPC) accredited honours Biomedical Science degrees which are essential for state registration and subsequent NHS employment for all Biomedical Scientists.

The award is designed for those who wish to take up a career in the science-based industries and in particular in the health care industries and the NHS, including:

- ◆ students progressing from appropriate Science and Maths National Certificate programmes which include NQ Units at Higher level
- ◆ students articulating from Scottish Wider Access Programmes
- ◆ school leavers with a minimum of one Science Higher at C grade and three Standard Grade 3/Intermediate 2 passes in Science and Maths subjects
- ◆ students who may have partially completed one or two years of a science degree programme

The HND Biomedical Science award is primarily designed as a full time programme but it may be possible to be completed by part time candidates over four years with appropriate support of open learning and integrated assessment.

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.

In respect of assessment, a combination of new and traditional authentication tools and techniques may have to be devised. Quality assurance procedures must also be sufficient and robust to support open and distance learning. Further advice and guidance is available in the SQA publication *Assessment and Quality Assurance for Open and Distance Learning* — SQA February 2001.

### 3.4 Progression routes

In designing the award, the Development Group has been fully aware of the need for the qualifications to contain relevant technical and transferable skills to enable immediate entry to employment while at the same time allowing articulation to degree courses. The Development Group believes that an appropriate balance between academic and vocational knowledge and skills has been achieved through the mix of Unit content and teaching approaches.

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 no difficulties are foreseen in maintaining existing articulation routes.

Articulation agreements are already in place for the existing HND Biomedical Sciences award and it is expected that similar agreements will be established for these new awards. Examples of existing support from various universities are as follows:

<b>HE Institution</b>	<b>Articulation from HND</b>
Paisley University	Third year of BSc (Hons) Biological/Biomedical Sciences
Glasgow Caledonian University	Third year of BSc (Hons) Biological/Biomedical Sciences
University of Strathclyde	Second year of BSc (Hons) Biological Science programmes
Bell College, Hamilton	Third year of BSc Applied Biological Sciences
University of Stirling	Second year of BSc Biological Sciences
Napier University, Edinburgh	Third year of BSc Applied Biological/Biomedical Sciences
University of St Andrews	Second/third year of BSc (Hons) Biological Science/Biotechnology
Robert Gordon University, Aberdeen	Third year of BSc Applied Science
University of Abertay, Dundee	Third year of BSc Biomedical Sciences/Biotechnology
University of Dundee	Second/third year of BSc Biological Sciences

Articulation arrangements will need to be agreed by each college, the above table shows examples of articulation only.

As mentioned earlier in this document the HND Biomedical Sciences is intended to act both as a vocational award and as an entry route to degree courses. It should be noted that this award is not accredited for biomedical scientist state registration, however because of the specialised nature of the award, its main progression route is

to third year direct entry of Health Professions Council (HPC) accredited honours degrees for state registration and subsequent NHS employment.

### **3.5 The Scottish Credit and Qualifications Framework**

Due cognisance has been taken of the requirements of the Scottish Credit and Qualifications Framework (SCQF) during the design of this award. This means that the HND Biomedical Sciences award is at SCQF level 8.

### **3.6 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 programme 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 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 HNC 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

The health care industry offers a wide range of technician posts including:

- ◆ Electron microscopy technician
- ◆ Perfusionists — following further training
- ◆ Phlebotomists — following further training

## **4 Access to the Award**

### **4.1 Access requirements for the award**

It is intended that admission to this course should be as broadly based as possible, 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:

- ◆ One Science Higher and not fewer than three Standard Grade 3/Intermediate 2 passes, including Chemistry, Biology, Biotechnology or Human Biology and Mathematics.
- ◆ National Qualification in an appropriate Science and Maths programme, such as SWAP Access to Science. Candidates should preferably possess some NQ Units at Higher level.
- ◆ Scottish Group Award (SGA) in Science at Intermediate 2.
- ◆ Qualification comparable to the above, gained through other awarding bodies, such as GCSE, City and Guilds, Edexcel.
- ◆ At the discretion of the Principal 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
- ◆ Relevant Work Experience eg science industries, medical and NHS laboratories

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

## 5 Structure of the Award

### 5.1 HND Biomedical Sciences

#### Mandatory Units (27 credits)

Product code	Product title	Credit value	SCQF level
DG70 34	Presentation Skills in Science	1	7
H8XT 33*	Statistics for Science 1	1	7
D75X 34	Information Technology Applications Software 1	1	7
DH2K 34 Or H92X 34	Fundamental Chemistry: Theory and Practice Or Fundamental Chemistry: Theory and Laboratory Skills	2  2	7  7
DJ1K 34 Or H927 34	Cell Biology: Theory and Practice Or Cell Biology: Theory and Laboratory Skills	1  1	7  7
H92C 35*	Human Body Structure and Function	2	8
DJ6Y 34	DNA Structure and Function	1	7
H92G 34*	Microbiology: Theory and Laboratory Skills	2	7
DF82 34	Quality and Health & Safety Systems in Science Industries	1	7
H91W 34*	Applied Sciences: Graded Unit 1	1	7
DH2J 34 Or H922 34	Biochemistry: Theory and Practice Or Biochemistry: Theory and Laboratory Skills	1  1	7  7
H91T 34*	Applied Biochemical Techniques	1	7
DJ6X 35 Or H92A 35	DNA Molecular Techniques: Theory and Practice DNA Molecular Techniques	2  2	8  8
H92F 35*	Microbiological Techniques	2	8
DH2M 35	Immunotechnology: Theory and Practice	1	8
H925 35*	Biomedical Pathology	1	8
H924 35*	Biomedical Investigations	1	8
H928 35*	Cellular Signalling	1	8
H92D 35*	Human Metabolism	2	8
DR1P 35	Biomedical Sciences: Graded Unit 2 — Project	2	8

#### Optional Units (3 credits)

Product code	Product title	Credit value	SCQF level
DN38 34	Sustainable Development	1	7
H92J 35*	Protein Structure and Function: Theory and Practice	1	8
DH2L 35 Or H92E 35	Immunological Techniques: Theory and Practice Or Immunological Techniques	1  1	8  8

Product code	Product title	Credit value	SCQF level
DH54 35 Or H930 35	Instrumental Techniques: Theory and Practice 1 Or Instrumental Techniques 1	1  1	8  8
D77H 34	Employment Experience 2	1	8
D033 13	Environmental Biology	1	7
DN36 34	Earth Science	1	7
DN62 34	Managing Sites for Biodiversity	2	7
DJ00 34 Or H926 34	Biotechnology : An Introduction Or Biotechnology : An Introduction	1  1	7  7
DH2H 34 Or H920 34	Animal and Plant Cell Culture: An Introduction Or Animal and Plant Cell Culture: An Introduction	1  1	7  7
DP2R 34 Or H936 34	Fundamental Concepts of Physical Chemistry Or Physical Chemistry: Theory and Laboratory Skills	1  1	7  7
DP4P 34	Genetics	1	7
DP4W 35	Medicinal Chemistry	1	8
DX29 33 Or H92W 33	Fundamental Chemistry: An Introduction Or Fundamental Chemistry: An Introduction	1  1	6  6
H8XP 33*	Mathematics for Science 1	1	6
H93D 33*	Physics 1	1	6
H8T2 33*	Workplace Communication in English	1	6
DE3R 34	Personal Development Planning	1	7
DG6E 34 Or DG6G 35	Work Role Effectiveness (2003)  Work Role Effectiveness (2003)	3  3	7  8
H934 34	Ecology and Ecosystems	1	7

\*Refer to History of Changes for revision changes.

Any other newly devised HN Science Unit may be added to the framework. Please contact SQA for further information.

## 5.2 Graded Units

The purpose of the Graded Units is to assess the candidate's ability to integrate and apply the knowledge and/or skills gained in individual Units, to demonstrate that they have achieved the specific aims as detailed in section 3.2 and Appendix 4, and to grade candidate achievement.

Candidates will take a 1 credit Graded Unit at level 7 in the HNC Applied Sciences award. As well as the 1 credit Graded Unit, candidates will also take a 2 credit Graded Unit at level 8 in year 2 of the HND Biomedical Sciences award.

### **5.2.1 Type of Graded Units**

#### **HNC Applied Sciences: Investigation Report (HND Biomedical Sciences Year 1)**

This Unit will be a project based on an investigation which should take place during the last block of study. It will cover a range of skills achieved through studying the mandatory Units of the award.

#### **HND Biomedical Sciences: Practical Assignment**

This Unit will be a project based on a practical assignment which should take place during the last block of the second year of study. It will cover a range of skills achieved through studying the mandatory Units of the award.

### **5.2.2 Rationale for Graded Unit Assessment**

#### **Investigation Report**

Candidates will be given a topic to research. They will produce a report covering the planning, developing and evaluation stages of the investigation.

An investigation report allows candidates to integrate knowledge and skills gained in the mandatory Units. It allows them to use research skills, set timescales, identify main issues, methods and sources of research. It also allows them to use written scientific reporting skills in setting out the aims, data, analysis, summary, evaluation and references relevant to their investigation.

## Practical Assignment

Candidates will be given a practical assignment to carry out. They will produce a laboratory report covering the planning, developing and evaluation stages of the project.

A practical assignment allows candidates to integrate knowledge and skills gained in the mandatory Units. It allows them to use practical laboratory skills, GLP, risk assessments and other Health and Safety considerations as well as extending investigative skills to a practical situation. It also allows them to use written laboratory reporting skills by producing a logbook/diary of their activities as well as the final laboratory report.

## 5.3 Core skills

This award has been designed using the new design principles and therefore the importance of Core Skills has been recognised and these are developed throughout the award. These Core Skills may be embedded in the entry qualifications that the presenting students have already achieved, eg Problem Solving at Intermediate 2 is embedded in all Science Highers. It should be noted that although there is no mandatory entry and exit levels the following is recommended:

### 5.3.1 HND Biomedical Sciences

Core Skill	Recommended Entry Level	Recommended Exit Level
Communication	Intermediate 2	Higher
Numeracy	Intermediate 2	Higher
Information Technology	Intermediate 2	Higher
Problem Solving	Intermediate 2	Higher
Working With Others	Intermediate 2	Higher

### 5.3.2 Core Skills Signposting

There may be opportunities to gather evidence towards Core Skills or Core Skills Components (see Appendix 1) 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: Applications Software 1	H	M



Core Skill	Component	HN Unit	Level	Mandatory /Optional
Problem Solving	Critical Thinking			
	Planning and Organising			
	Reviewing and Evaluating			
Working with Others				

#### 5.4 Conditions of the award

Candidates will be awarded an HND Biomedical Sciences on successful completion of 240 SCQF credit points which will include successful achievement of all the Units and the Graded Unit in the mandatory section (27 mandatory Unit credits and 3 option Unit credits giving a total of 30 credits).

The mandatory Units include 112 SCQF points at level 8 ie, the minimum number of SCQF points at level 8 can be achieved through attainment of the mandatory section.

#### 5.5 SCQF levels

The table below show the distribution of SCQF levels in the HND Biomedical Sciences award:

Level 7	Level 8	SQA minimum requirement for level 8 awards
104 mandatory 24+ optional	112 mandatory 40+ optional	64 SCQF credit points

## **6 Approaches to Delivery and Assessment**

### **6.1 Content and context**

The HND Biomedical Sciences is a specialised award which allows candidates to gain advanced knowledge and technical skills in quality issues, microbiology, DNA technology, immunology, cell culture and instrumentation together with specialised biomedical areas. As such, it is intended to prepare candidates for employment at senior technician level in general science laboratories.

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

The award allows candidates to progress to a range of study options in Higher Education, particularly those Biomedical Sciences degrees which have been approved for state registration.

### **6.2 Delivery and assessment**

Although centres can choose what order in which to teach the Units within the awards, guidelines have been produced on timetabling the mandatory Units (Appendix 2). These timetables reflect the building block nature of the Units.

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.

#### **6.2.1 Practical laboratory hours**

The hours in the following table are an estimate based on mandatory practical assessment.

It is envisaged that this estimate will be much higher due to the release of time for practical work by the introduction of end-of-Unit assessment.

**Mandatory Units (27 credits)**

<b>Product code</b>	<b>Product title</b>	<b>Credit value</b>	<b>Lab practical hours</b>
DG70 34	Presentation Skills in Science	1	0
H8XT 33*	Statistics for Science 1	1	0
D75X 34	Information Technology Applications Software 1	1	0
DH2K 34	Fundamental Chemistry: Theory and Practice	2	40
DJ1K 34	Cell Biology: Theory and Practice	1	10
H92C 35*	Human Body Structure and Function	2	10
DJ6Y 34	DNA Structure and Function	1	10
H92G 34*	Microbiology: Theory and Laboratory Skills	2	20
DF82 34	Quality and Health & Safety Systems in Science Industries	1	0
H91W 34*	Applied Sciences: Graded Unit 1	1	0
DH2J 34	Biochemistry: Theory and Practice	1	10
H91T 34*	Applied Biomedical Techniques	1	10
DJ6X 35	DNA and Molecular Techniques: Theory and Practice	2	20
H92F 35*	Microbiological Techniques	2	20
DH2M 35	Immunotechnology: Theory and Practice	1	10
H925 35*	Biomedical Pathology	1	6
H924 35*	Biomedical Investigations	1	6
H928 35*	Cellular Signalling	1	6
H92D 35*	Human Metabolism	2	14
DR1P 35	Biomedical Sciences: Graded Unit 2 — Project	2	60

**Optional Units (3 credits)**

<b>Product code</b>	<b>Product title</b>	<b>Credit value</b>	<b>Lab practical hours</b>
H92J 35*	Protein Structure and Function: Theory and Practice	1	10
DH2H 34	Animal and Plant Cell Culture: An Introduction	1	10
DH2L 35	Immunological Techniques: Theory and Practice	1	10
DH54 35	Instrumental Techniques: Theory and Practice 1	1	20
D77H 34	Employment Experience 2	1	30
DP4P 34	Genetics	1	10
DV9D 35	Bioinformatics	1	0
DP4W 35	Medicinal Chemistry	1	3
H93A 34*	Ecology and Ecosystems	1	0
DX29 33	Fundamental Chemistry: An Introduction	1	0

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

\*Refer to History of Changes for revision changes.

### 6.3 Reassessment

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

Candidates may require to be reassessed on only 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-sit a whole assessment include:

- ◆ assessments which test knowledge and understanding and where it may not be possible to extract some of the items for reassessment 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 Reassessment opportunities

Reassessment 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 reassessment 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 reassessment 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 part for reassessment 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.

### **6.3.3 Assessment exemplars**

Exemplar assessment instruments will be available for all mandatory Units and a selection of optional Units. The exemplars provide guidance on content, conduct, evidence required and marking and grading. Centres are expected to use these exemplars as templates when producing further assessment instruments.

### **6.3.4 Reassessing HN Graded Units**

Reassessment would take the form of resubmission of the evidence to show higher degrees of clarity and understanding.

Reassessment would be at the discretion of the centre and should be subject to rigorous internal moderation.

## **6.4 Relationship to other awards**

It is envisaged that there will be a range of Units common to the new HND Science awards enabling candidates to transfer Units from one award to another.

## **7 Guidance for Centres**

### **7.1 Assessment moderation**

All assessment instruments used within this award should be internally moderated, including assessment exemplar materials, using appropriate policies within the centre and guidelines provided by SQA. This will ensure the validity and reliability of the instruments of assessments used within the centre.

External moderation will be carried out by SQA to ensure that internal assessment is within the national guidelines for this qualification.

For further information on internal and external moderation refer to the SQA publication *Guide to Assessment and Quality Assurance for Colleges of Further Education*, August 2003 Revision.

### **7.2 Open and distance learning**

HND Biomedical 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.

### **7.3 Candidates with additional support needs**

There should be no artificial barriers to learning or assessment. Special needs of individual candidates should be taken into account when planning learning experiences and selecting assessment instruments. For example, some candidates may require a longer period for the single assessment or may require that it be split into more than one event. Additional guidance on special needs can be found in *Guidance on Special Assessment Arrangements* (AA0645/3, December 2001).

### **7.4 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.

An example of transitional arrangements between the current HNC Biomedical Sciences and the new HNC Applied Sciences is illustrated in Appendix 3. This table identifies the credit transfer candidates can achieve towards the new HND Biomedical Sciences. However, it is recommended that current students complete the 2nd year of current HND Science awards. This guide is for illustration only and centres should ensure they have the appropriate candidate evidence available for a Moderator check.

## **7.5 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 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), practical laboratory hours (6.2.1), access arrangements (4.1 and 4.2), articulation routes (3.4), employment opportunities (3.6).

## 8 History of Changes

It is anticipated that changes will take place during the life of the qualification, eg additional optional Units, updated specifications, and this section will record these changes.

Therefore the SQA has set up a review panel to monitor and evaluate the appropriateness of the award with respect to content, delivery and assessment.

The updated Arrangements document will be published on the SQA website and course leaders should ensure they check this document on a regular basis.

Date	Version number	Description of change
14/09/2015	05	<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>Biochemistry: Theory and Laboratory Skills (H922 34) added as an alternative to Biochemistry: Theory and Practice (DH2J 34)</p> <p>DNA Molecular Techniques (H92A 35) added as an alternative to DNA Molecular Techniques: Theory and Practice (DJ6X 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>Animal and Plant Cell Culture: An Introduction (H920 34) added as an alternative to Animal and Plant Cell Culture: An Introduction (DH2H 34)</p> <p>Instrumental Techniques 1 (H930 35) added as an alternative to Instrumental Techniques: Theory and Practice 1 (DH54 35)</p> <p>Fundamental Chemistry: An Introduction (H92W 33) added as an alternative to Fundamental Chemistry: An Introduction (DX29 33)</p> <p>Immunological Techniques (H92E 35) added as an alternative to Immunological Techniques: Theory and Practice (DH2L 35)</p> <p>Physical Chemistry: Theory and Laboratory Skills (H936 34) added as an alternative to Fundamental Concepts of Physical Chemistry (DP2R 34)</p>



<b>Date</b>	<b>Version number</b>	<b>Description of change</b>
July 2015	04	<b>Revision of Unit:</b> DE1K 33 workplace Communication in English has been replaced by H8T2 33 and will finish 31/07/2016
July 2015	04	<b>Revision of Unit:</b> DN37 Ecology and Ecosystems has been replaced by H93A 34 and will finish 31/07/2015
July 2015	04	<b>Revision of Unit:</b> DN8D 33 Mathematics for Science 1 has been replaced by H8XP 33 and will finish 31/07/2015
July 2015	04	<b>Revision of Unit:</b> DG6X 35 Protein Structure and Function: Theory and Practice has been revised by H92J 35 Protein Structure and Function: Theory and Practice and will finish 31/07/2017
July 2015	04	<b>Revision of Unit:</b> DH55 34 Microbiology: Theory and Practice has been revised by H92G 34 Microbiology: Theory and Laboratory Skills and will finish 31/07/2017
July 2015	04	<b>Revision of Unit:</b> DH2P 35 Microbiological Techniques: Theory and Practice has been revised by H92F 35 Microbiological Techniques and will finish 31/07/2017
July 2015	04	<b>Revision of Unit:</b> DN39 35 Human Metabolism has been revised by H92D 35 Human Metabolism and will finish 31/07/2017
July 2015	04	<b>Revision of Unit:</b> DG71 35 Human Body Structure and Function has been revised by H92C 35 Human Body Structure and Function and will finish 31/07/2017
July 2015	04	<b>Revision of Unit:</b> DP4T 35 Cellular Signalling has been revised by H928 35 Cellular Signalling and will finish 31/07/2017
July 2015	04	<b>Revision of Unit:</b> DN35 35 Biomedical Pathology has been revised by H925 35 Biomedical Pathology and will finish 31/07/2017
July 2015	04	<b>Revision of Unit:</b> DP4R 35 Biomedical Investigations has been revised by H924 35 Biomedical Investigations and will finish 31/07/2017

Date	Version number	Description of change
July 2015	04	<b>Revision of Unit:</b> DJ89 34 Applied Sciences: Graded Unit 1 has been revised by H91W 34 Applied Sciences: Graded Unit 1 and will finish 31/07/2017
July 2015	04	<b>Revision of Unit:</b> DG6Y 34 Applied Biomedical Techniques has been revised by H91T 34 Applied Biomedical Techniques and will finish 31/07/2017
July 2015	04	<b>Revision of Unit:</b> DN8C 34 Statistics for Science 1 has been revised by H8XT 33 Statistics for Science 1 and will finish 31/07/2017
Sept 2009	03	Additional Unit added to optional framework
June 2006	02	New Units added to framework. Change to course framework. Removal of Graded Units from Arrangements document.

# **Appendix 1**

## **Core Skills — Signpost Matrix**

Units	Core Skills				
	Numeracy	Communication	Information Technology	Problem Solving	Working with others
Statistics for Science	✓ 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			
Biochemistry: Theory and Practice		✓ Higher			
Applied Biomedical Techniques: An Introduction	✓ Higher	✓ Higher		✓ Higher	
DNA Molecular Techniques: Theory & Practice		✓ Higher		✓ Higher	
Microbiological Techniques	✓ Higher	✓ Higher			
HNC Graded Unit		✓ Higher		✓ Higher	
HND Graded Unit		✓ Higher		✓ Higher	
Immunological Techniques		✓ Higher		✓ Higher	
Biomedical Pathology		✓ Higher		✓ Higher	
Biomedical Investigations	✓ Higher	✓ Higher		✓ Higher	
Cellular Communication		✓ Higher			
Human Metabolism	✓ Higher	✓ Higher		✓ Higher	✓ Intermediate 2
Protein Structure and Function: Theory and Practice		✓ Higher		✓ Higher	✓ Intermediate 2
Immunotechnology: Theory and Practice		✓ Higher			
Instrumental Techniques: Theory and Practice 1	✓ Higher	✓ Higher		✓ Higher	
Animal and Plant Cell Culture: An Introduction		✓ Higher		✓ Higher	
Genetics		✓ Higher			
Bioinformatics		✓ Higher	✓ Higher	✓ Higher	
Medicinal Chemistry		✓ Higher		✓ Higher	✓ Higher
Employment Experience 2					✓ Higher

## 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	Outcome 2	Developed	√	√
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	√	√
DNA Molecular Techniques: Theory and Practice	Outcomes 1-4	Developed	√	√
Microbiology: Theory and Laboratory Skills	Outcomes 1-3	Developed	√	√
Microbiological Techniques	Outcomes 1-4	Developed	√	√
Immunological Techniques	Outcomes 1 and 2	Developed	√	√
Instrumental Techniques: Theory and Practice 1	Outcomes 1 and 2	Developed	√	√
Animal and Plant Cell Culture: An Introduction	Outcomes 1-3	Developed	√	√
Immunotechnology: Theory and Practice	Outcomes 1-3	Developed	√	√
Biochemistry: Theory and Practice	Outcomes 1-3	Developed	√	√
Applied Biomedical Techniques: An Introduction	Outcomes 1-4	Developed	√	√
Human Body Structure and Function	Outcomes 1-6	Developed	√	√
Biomedical Pathology	Outcomes 1-3	Developed	√	√
Biomedical Investigations	Outcomes 1-3	Developed	√	√
Cellular Communication	Outcomes 1-4	Developed	√	√
Human Metabolism	Outcomes 1-5	Developed	√	√
Protein Structure and Function: Theory and Practice	Outcomes 1-4	Developed	√	√
Genetics	Outcomes 1-4	Developed	√	√
Bioinformatics	Outcomes 1 and 2	Developed	√	√
Medicinal Chemistry	Outcomes 1-4	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	<b>Outcomes 1 and 3</b>	Assessed	√	√	√	√	√
Quality and Health & Safety in Science Industry	<b>Outcome 3</b>	Developed	√	√	√	√	√
Fundamental Chemistry: Theory and Practice	<b>Outcomes 1 and 2</b>	Developed	√	√	√		
Cell Biology: Theory and Practice	<b>Outcomes 1,2 and 4</b>	Developed	√	√	√		
DNA Structure and Function	<b>Outcomes 1-5</b>	Developed	√	√	√		
DNA Molecular Techniques: Theory and Practice	<b>Outcomes 1-4</b>	Developed	√	√	√		
Microbiology: Theory and Laboratory Skills	<b>Outcomes 1-4</b>	Developed	√	√	√		
Microbiological Techniques	<b>Outcomes 1-5</b>	Developed	√	√	√		
Immunological Techniques	<b>Outcomes 1-3</b>	Developed	√	√	√		
Instrumental Techniques: Theory and Practice 1	<b>Outcomes 1-3</b>	Developed	√	√	√		
Animal and Plant Cell Culture: An Introduction	<b>Outcomes 1-4</b>	Developed	√	√	√		
Food Science: Theory and Practice	<b>Outcomes 1-3</b>	Developed	√	√	√		
Immunotechnology: Theory and Practice	<b>Outcomes 1-3</b>	Developed	√	√	√		
Biochemistry: Theory and Practice	<b>Outcomes 1-3</b>	Developed	√	√	√		
Applied Biomedical Techniques: An Introduction	<b>Outcomes 1-4</b>	Developed	√	√	√		
Instrumental Techniques: Theory and Practice 2	<b>Outcomes 1-3</b>	Developed	√	√	√		
Human Body Structure and Function	<b>Outcomes 1-6</b>	Developed	√	√	√	√	√
Biomedical Pathology	<b>Outcomes 1-3</b>	Developed	√	√	√	√	√
Biomedical Investigations	<b>Outcomes 1-3</b>	Developed	√	√	√		
Cellular Communication	<b>Outcomes 1-4</b>	Developed	√	√	√		
Human Metabolism	<b>Outcomes 1-6</b>	Developed	√	√	√		
Protein Structure and Function: Theory and Practice	<b>Outcomes 1-4</b>	Developed	√	√	√		
Genetics	<b>Outcomes 1-4</b>	Developed	√	√	√		
Bioinformatics	<b>Outcome 1</b>	Developed	√	√	√		
Medicinal Chemistry	<b>Outcomes 1-4</b>	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	Outcome 4	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	√	√	√	√
Bioinformatics	Outcomes 1 and 2	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	<b>Outcomes 1 and 2</b>	Developed	√	√	√
Fundamental Chemistry: Theory and Practice	<b>Outcomes 1 and 2</b>	Developed	√	√	√
Microbiology: Theory and Laboratory Skills	<b>Outcomes 2, 3 and 4</b>	Developed	√	√	√
Microbiological Techniques	<b>Outcomes 2 and 4</b>	Developed	√	√	√
Applied Biomedical Techniques: An Introduction	<b>Outcomes 1 and 2</b>	Developed	√	√	√
Instrumental Techniques: Theory and Practice 2	<b>Outcomes 1-3</b>	Developed	√	√	√
Human Body Structure and Function	<b>Outcome 3, 4 and 6</b>	Developed	√	√	√
Biomedical Investigations	<b>Outcome 2</b>	Developed	√	√	√
Human Metabolism	<b>Outcome 1</b>	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

<b>Unit</b>	<b>Knowledge/ Skills/ Evidence</b>	<b>Developed/ Assessed</b>	<b>a</b>	<b>b</b>
Statistics for Science	<b>Outcomes 1 and 2</b>	Developed	√	√
Fundamental Chemistry: Theory and Practice	<b>Outcomes 1 and 2</b>	Developed	√	√
Microbiology: Theory and Laboratory Skills	<b>Outcomes 2, 3 and 4</b>	Developed	√	√
Applied Biomedical Techniques: An Introduction	<b>Outcomes 2 and 4</b>	Developed	√	√
Instrumental Techniques: Theory and Practice 2	<b>Outcomes 1-3</b>	Developed	√	√
Human Body Structure and Function	<b>Outcome 4 and 6</b>	Developed	√	√
Human Metabolism	<b>Outcome 1</b>	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	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	√	√	√
Applied Biomedical Techniques: An Introduction	Outcomes 2 and 4	Developed	√	√	√
Instrumental Techniques: Theory and Practice 2	Outcomes 1-4	Developed	√	√	√
Biomedical Investigations	Outcome 2	Developed	√	√	√
Human Metabolism	Outcome 1	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	<b>Outcomes 1 and 2</b>	Developed/Assessed	√	√	√
DNA Molecular Techniques: Theory and Practice	<b>Outcome 5</b>	Developed	√	√	√
Protein Structure and Function: Theory and Practice	<b>Outcomes 1-4</b>	Developed	√	√	√
Immunological Techniques	<b>Outcome 1-3</b>	Developed	√	√	√
Instrumental Techniques: Theory and Practice 1	<b>Outcomes 1-3</b>	Developed	√	√	√
Animal and Plant Cell Culture: An Introduction	<b>Outcomes 1-4</b>	Developed	√	√	√
Applied Biomedical Techniques: An Introduction	<b>Outcomes 1-4</b>	Developed	√	√	√
Biomedical Pathology	<b>Outcomes 1-3</b>	Developed	√	√	√
Biomedical Investigations	<b>Outcome 3</b>	Developed	√	√	√
Human Metabolism	<b>Outcome 6</b>	Developed	√	√	
Bioinformatics	<b>Outcome 2</b>	Developed	√	√	
Medicinal Chemistry	<b>Outcome 2</b>	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	<b>Outcome 2</b>	Developed	√	√	√
DNA Molecular Techniques: Theory and Practice	<b>Outcome 5</b>	Developed	√	√	√
Protein Structure and Function: Theory and Practice	<b>Outcome 4</b>	Developed	√	√	√
Immunological Techniques	<b>Outcome 3</b>	Developed	√	√	√
Instrumental Techniques: Theory and Practice	<b>Outcomes 1-3</b>	Developed	√	√	√
Animal and Plant Cell Culture: An Introduction	<b>Outcome 4</b>	Developed	√	√	√
Applied Biomedical Techniques: An Introduction	<b>Outcomes 1-4</b>	Developed	√	√	√
Biomedical Pathology	<b>Outcomes 1-3</b>	Developed	√	√	√
Biomedical Investigations	<b>Outcome 3</b>	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	√	√	√
Immunological Techniques	Outcome 3	Developed	√	√	√
Instrumental Techniques: Theory and Practice 1	Outcomes 1-3	Developed	√	√	√
Applied Biomedical Techniques: An Introduction	Outcomes 1-4	Developed	√	√	√
Biomedical Pathology	Outcomes 1-3	Developed	√	√	√
Biomedical Investigations	Outcome 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: Theory and Practice	Outcome 4	Developed	√	√	√		
Employment Experience 2	Outcomes	Developed	√	√	√	√	√
Medicinal Chemistry	Outcomes 1-4	Developed	√	√	√	√	√

## **Appendix 2**

### **Guidelines for timetabling of mandatory Units**



## HND Biomedical Sciences year 1

BLOCK 1	Fundamental Chemistry: T&P	Microbiology: T&L	Quality and H&S Systems C	Cell Biology C	IT:AS 1 C
Block 2			Presentation Skills in Science C	Biochemistry C	Human Body Structure and Function C
Block 3	Graded Unit C	DNA Structure and Function C	Statistics for Science C	Applied Biomedical Techniques C	

## HND Biomedical Sciences year 2

BLOCK 1	DNA and Molecular Techniques C	Cellular Communication C	Biomedical Pathology C	Human Metabolism C	Microbiological Techniques C
Block 2		Immunotechnology: Theory and Practice C	Biomedical Investigations C		
Block 3	Graded Unit C		O	O	O

Additional optional units: Protein Structure and Function: Theory and Practice (x1), Animal and Plant Cell Culture (x1), Immunological Techniques (x1), Instrumental Techniques 1 (x1), Employment Experience 2 (x1), Genetics (x1), Bioinformatics (x1), Medicinal Chemistry (x1), other HN Science options.

## **Appendix 3**

### **Credit Transfer arrangements**

**Alternative route for candidates transferring from current HNC/D (year 1) Biomedical Sciences to revised HND Biomedical Sciences (year 2)**

<b>New unit</b>	<b>Credit value</b>	<b>Core/Option</b>	<b>Old unit</b>	<b>Credit value</b>	<b>Core/Option</b>	<b>Old outcomes covering new unit</b>	<b>Outcomes in new unit not covered</b>
Presentation Skills in Science DG70 34	1	C	Presentation Skills in Science D3AY 04	1	Recommended additional HND unit for year 2 progression	all	
Statistics for Science H8XT 33	1	C	Probability and Statistics D41Y 04	1.5	O	all	
			Biotechnology: Physical Aspects, Instrumentation and Numerical Analysis, Part 1 D5XK 04	1	O	2,4	
Information Technology: Applications Software 1 D75X 34	1	C	Information Technology Applications 1 A6AM 04	1	Recommended additional HND unit for year 2 progression	all	
Fundamental Chemistry: Theory and Practice DH2K 34	2	C	Chemistry for Biological Sciences D3FV 04	2	C	all	
Quality and Health & Safety in Science Industries DF82 34	1	C	Quality and Safety Systems in Biotechnology D3B6 04	1	Recommended additional HND unit for year 2 progression	all	
Applied Sciences: Graded Unit 1 – Investigation H91W 34	1	C					all
Cell Biology: Theory and Practice DJ1K 34	1	C	Cell Biology A53J 04	1	HND core unit	1,2,4	4
DNA: Structure and Function DJ6Y 34	1	O	Introduction to Genetics A6K2 04	1	O	1,4	
Microbiology: Theory and Laboratory Skills H92G 34	2	O	Introductory Microbiology D3FW 04	1.5	C	1,4	Parts of 1,2,3
Biochemistry: Theory and Practice DH2J 34	1	O	Biological Molecules A53D 04	1	C	all	
Applied Biomedical 1 Techniques H91T 34	1	O	Basic Biochemical Methods: Theory and Practice D3JP 04	2	C	1,2,4,5,6	

<b>New unit</b>	<b>Credit value</b>	<b>Core/Option</b>	<b>Old unit</b>	<b>Credit value</b>	<b>Core/Option</b>	<b>Old outcomes covering new unit</b>	<b>Outcomes in new unit not covered</b>
Human Body Structure and Function H92C 35	2	O	Human Body Structure and Function D3FT 04	2	C	all	

# **Appendix 4**

## **HN Aims Tables**

## General aims of the HND Biomedical Sciences

<b>General aims</b>	<b>Develop candidates' knowledge and skills</b>	<b>Develop employment skills</b>	<b>Enable progression with the SCQF</b>	<b>Develop study and research skills</b>	<b>Develop transferable skills</b>	<b>Provide a stimulating and intellectually satisfying learning experience</b>	<b>Develop in the candidate skills of independent study and communication</b>	<b>Provide the candidate with a deeper underpinning knowledge</b>
<b>Unit titles</b>								
<b>Presentation Skills in Science</b>	√	√	√	√	√	√	√	
<b>ITA Software 1</b>	√	√	√		√	√	√	
<b>Fundamental Chemistry: T&amp;P</b>	√	√	√	√	√	√	√	
<b>Quality and H&amp;S Systems in Science Industries</b>	√	√	√	√	√	√	√	
<b>Graded Unit 1</b>	√	√	√	√	√	√	√	
<b>Statistics for Science</b>	√	√	√	√	√	√	√	
<b>Cell Biology: T&amp;P</b>	√	√	√	√	√	√	√	
<b>DNA Structure and Function</b>			√		√	√	√	
<b>Microbiology: T&amp;L</b>	√	√	√	√	√	√	√	
<b>Biochemistry: T&amp;P</b>	√	√	√	√	√	√	√	√
<b>Applied Biomedical Techniques</b>	√	√	√	√	√	√	√	√
<b>Human Body Structure and Function</b>		√	√		√	√	√	√

<b>General aims</b>	<b>Develop candidates' knowledge and skills</b>	<b>Develop employment skills</b>	<b>Enable progression with the SCQF</b>	<b>Develop study and research skills</b>	<b>Develop transferable skills</b>	<b>Provide a stimulating and intellectually satisfying learning experience</b>	<b>Develop in the candidate skills of independent study and communication</b>	<b>Provide the candidate with a deeper underpinning knowledge</b>
<b>Unit titles</b>								
<b>DNA &amp; Molecular Techniques: T&amp;P</b>	√	√	√	√	√	√	√	√
<b>Microbiological Techniques</b>	√	√	√	√	√	√	√	√
<b>Immunological Techniques: T&amp;P</b>	√	√	√	√	√	√	√	√
<b>Biomedical Pathology</b>	√	√	√	√	√	√	√	√
<b>Biomedical Investigations</b>	√	√	√	√	√	√	√	√
<b>Cellular Communication</b>	√	√	√	√	√	√	√	√
<b>Human Metabolism</b>	√	√	√	√	√	√	√	√
<b>Graded Unit 2</b>	√	√	√	√	√	√	√	√
<b>Immunotechnology: T&amp;P</b>	√	√	√	√	√	√	√	√
<b>Protein Structure &amp; Function: T&amp;P</b>	√	√	√	√	√	√	√	√
<b>Instrumental Techniques: T&amp;P 1</b>	√	√	√	√	√	√	√	√
<b>Animal &amp; Plant Cell Culture: An Introduction</b>	√	√	√	√	√	√	√	
<b>Genetics</b>	√	√	√	√	√	√	√	
<b>Bioinformatics</b>	√	√	√	√	√	√	√	
<b>Medicinal Chemistry</b>	√	√	√	√	√	√	√	√
<b>Employment Experience 2</b>	√	√	√	√	√	√	√	

## Specific aims of the HND Biomedical Sciences

<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>Unit title</b>							
<b>Presentation Skills in Science</b>	√	√	√	√	√	√	
<b>ITA Software 1</b>	√	√	√	√	√	√	
<b>Fundamental Chemistry: T&amp;P</b>	√	√	√	√	√	√	√
<b>Quality and H&amp;S Systems in Science Industries</b>	√	√	√	√	√	√	
<b>Graded Unit 1</b>	√	√	√	√	√	√	
<b>Statistics for Science</b>	√	√	√	√	√	√	
<b>Cell Biology: T&amp;P</b>	√	√		√	√	√	√
<b>DNA Structure and Function</b>	√	√	√	√	√	√	√
<b>Microbiology: T&amp;L</b>	√	√	√	√	√	√	√
<b>Biochemistry: T&amp;P</b>	√	√	√	√	√	√	√
<b>Applied Biomedical Techniques</b>	√	√	√	√	√	√	√
<b>Human Body Structure and Function</b>	√	√	√	√	√	√	√



<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>Unit title</b>							
<b>DNA &amp; Molecular Techniques: T&amp;P</b>	√	√	√	√	√	√	√
<b>Microbiological Techniques</b>	√	√	√	√	√	√	√
<b>Immunological Techniques: T&amp;P</b>	√	√	√	√	√	√	√
<b>Biomedical Pathology</b>	√	√	√	√	√	√	√
<b>Biomedical Investigations</b>	√	√	√	√	√	√	√
<b>Cellular Communication</b>	√	√	√	√	√	√	√
<b>Human Metabolism</b>	√	√	√	√	√	√	√
<b>Graded Unit 2</b>	√	√	√	√	√	√	√
<b>Protein Structure &amp; Function: T&amp;P</b>	√	√	√	√	√	√	√
<b>Animal &amp; Plant Cell Culture: An Introduction</b>	√	√	√	√	√	√	√
<b>Immunotechnology: T&amp;P</b>	√	√	√	√	√	√	√
<b>Instrumental Techniques: T&amp;P 1</b>	√	√	√	√	√	√	√
<b>Genetics</b>	√	√	√	√	√	√	√
<b>Bioinformatics</b>	√	√	√	√	√	√	√
<b>Medicinal Chemistry</b>	√	√	√	√	√	√	√
<b>Employment Experience 2</b>	√	√	√	√	√		√