XSQA

Arrangements for:

Higher National Diploma in Food Science and Technology

Group Award Code: G9PX 16

Validation date: April 2010

Date of original publication: June 2010

Version: 03 (August 2018)

Acknowledgement

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.

Version number	Description	Date
03	**Revision of Units:** F5CP 34 Supervision and Management (finish date 31/07/2021) has been replaced by J1BT 34 Supervision and Management (start date 01/08/2018). F1RJ 34 Business Management: An Introduction (finish date 31/07/2021) has been replaced by J1BV 34 Business Management: An Introduction(start date 01/08/2018).	31/08/18
02	**Revision of Units:** DN8C 34 Statistics for Science 1 has been revised by H8XT 33. DV08 35 Statistics for Science 2 has been revised by H8XV 34. Old units will finish on 31/07/2017. DE1K 33 Workplace Communication in English has been revised by H8T2 33 and finishes on 31/07/2016.	21/05/15

Contents

1   Introduction

This is the Arrangements Document for the HND in Food Science and Technology G9PX 16 which was validated in April 2010. This document includes background information on the development of the Group Award, its aims, guidance on access, details of the Group Award structure, and guidance on delivery.

The HND in Food Science and Technology is a new national award. It has been developed using the revised Design Principles for HN qualifications and replaces the locally devised HND Food Technology G2DY16 which was based on design principles which have now been superseded. The HND in Food Science and Technology is a progression from the Higher National Certificate (HNC) Food Science and Technology G9DD 15 which was validated in June 2009.

The HND Food Science and Technology has similar objectives to the HNC Food Science and Technology. It is designed to prepare candidates for employment in a scientific or technical capacity in the food and drink industry, although HND holders should be able to take up posts with a greater degree of accountability and responsibility. They may also be able to fill posts that include some supervisory responsibility. The HND will provide candidates with the technical and scientific skills required by the food and drink industry and give them relevant background knowledge and understanding to help them make the best use of these skills in a commercial environment. It will do this on a more extensive and comprehensive basis than is possible in the HNC.

A Qualifications Development Team (QDT) was established to develop then national award HND in Food Science and Technology, which consisted of representatives from centres, industry, higher education, Improve (the Sector Skills Council), Royal Environment Health Institute of Scotland (REHIS), the Education Food and Drink Partnership, and SQA.

2   Rationale for the development of the Group Award

This section begins by summarising the main reasons for the development of the HND Food Science and Technology. Most, if not all, of the arguments also applied to the HNC Food Science and Technology. As section 1 pointed out, these awards can be seen as two stages of a single HN award designed to meet the current and future needs of the food industry in Scotland.

This section concentrates initially on the importance of the food and drink industry and the shortage of people to fill technical and scientific posts in the industry which is followed by some examples of the efforts which the industry is making to try to remedy this shortfall. It then examines the current provision of awards and qualifications to prepare people for entry into this occupational area. This further explanation includes details of the employer consultation undertaken on behalf of the QDT which, as well as providing support for the award, gives information on the employment opportunities available to successful candidates.

This section also covers the nature and purpose of the award and the title.

The main justification for the award is economic. It is based on two inter-related factors:

♦ the importance of food and drink manufacturing to the UK economy — and to the Scottish economy
♦ the shortage of technical and skilled workers in the food and drink manufacturing industry

There are other important reasons for the development of the new award. The HNC/D Food Technology had been one of the few post-school qualifications in Scotland specifically designed to prepare people for entry into technical positions in the food and drink manufacturing industry. If the current and future requirements of the food and drink manufacturing industry for skilled technical personnel are to be met, then it is important that suitable replacements for both awards are introduced.

As highlighted in the Introduction section, the HNC/HND Food Technology has now been discontinued, with the new HNC Food Science and Technology (G9DD 15) providing a replacement at HNC level. This new HNC award was the result of a review of previous provision and has resulted in an up to date award which meets the demands of employers and should be worthwhile to actual and potential candidates. As the second phase of the development, the HND Food Science and Technology adopted the same approach. It too is based on a review of previous provision and seeks to bring it up to date and to present this HND award in a manner which will encourage applicants.

All the above factors are important drivers for the new award in their own right but they are given added significance by the fact that (as noted earlier), the previous HNC/HND in Food Technology was scheduled for replacement as part of SQA's HN Modernisation programme. This programme applies to all HN awards offered by SQA, and regardless of other circumstances, it means that a review of the existing awards had to be undertaken.

2.1 Food and Drink Manufacturing

Data from the Food and Drink Federation indicates that food and drink manufacturing is the single largest manufacturing sector in the UK. In 2003, it employed about half a million people which is equivalent to 1 in 7 of the manufacturing workforce.[1] At that time, there were about 9,000 food and drink manufacturing enterprises in the UK. In 2008, about 49,000 people were employed in the food and drink manufacturing sector in Scotland, about 12% of the total industry workforce in the UK.[2] Food and drink is also the largest manufacturing sector in Scotland accounting for about 22% of the total manufacturing workforce in Scotland.[3]

---

[1] Demand for Skills in the UK Food and Drink Manufacturing Sector: Stage 1 of the Sector Skills Agreement: Demand Drivers, Improve, July 2006, section 3.2, page 9
[2] The Food and Drink Manufacturing Sector in Scotland: Labour Market Information Profile 2009 – 10, Improve, 2009
[3] ibid

The productivity of the industry, measured by Gross Value Added per employee, is the second highest among industrial sectors in the UK.[4] It is competitive internationally: a study by Jagger et al (2005) showed that the UK came second of 16 countries in total factor productivity for the food industry.[5] The industry is also important because of its connections with other industries. It buys two-thirds of UK agricultural output, for example.[6]

There are over 1,500 food and drink manufacturing workplaces in Scotland. The industry in Scotland accounts for 11% of the turnover of the GB food and drink manufacturing sector. The largest concentration of employment is in Glasgow City (11%) but just over a quarter of Scottish employment in food and drink manufacturing is in Aberdeenshire (10%), South Lanarkshire (9%) and North Lanarkshire (7%).[7]

In common with other manufacturing industries, employment in the food and drink sector in Scotland has been contracting with the industry losing about 10,000 jobs per annum between 2000 and 2007.[8] This fall is, however, substantially less than that of manufacturing industry as a whole.[9]

The importance of the food and drink industry to Scotland is reinforced by the publication in June, 2009 of Recipe for Success[10], the Scottish Government's first national food and drink policy. It sets a target of sales of £10 billion for the industry in 2017, up from £7.5 billion in 2007 (an increase of one-third over 10 years). It also sets out a policy to promote Scotland as 'Land of Food and Drink'. Food and drink is also recognised as a key sector for the UK as a whole. In 2010, the UK Government published Food 2030, its first food policy document for over 50 years[11].

Overall, therefore, food and drink manufacturing is an important sector in both the UK and the Scottish economies and it is anticipated that this will continue to be the case in the future. This implies a need for suitably skilled and qualified personnel which, in turn, suggests a need for qualifications which will prepare people for employment in the industry.

Before examining the demand for qualified personnel in more detail, it is worth identifying some of the key characteristics of the food and drink manufacturing industry. The following discussion is not intended to be comprehensive; rather it aims to highlight the complexity of the industry and to illustrate the kind of factors which impact on the design of any award intended for people wishing to take up employment in businesses engaged in food and drink manufacturing.

---

[4] Demand for Skills in the UK Food and Drink Manufacturing Sector: Stage 1 of the Sector Skills Agreement: Demand Drivers, op cit, section 3.3, page 12

[5] quoted in Demand for Skills in the UK Food and Drink Manufacturing Sector: Stage 1 of the Sector Skills Agreement: Demand Drivers, op cit, section 3.6, page 17

[6] Demand for Skills in the UK Food and Drink Manufacturing Sector: Stage 1 of the Sector Skills Agreement: Demand Drivers, op cit, section 3.2, page 11

[7] The Food and Drink Manufacturing Sector in Scotland: Labour Market Information Profile 2009 - 10, op cit

[8] ibid

[9] Demand for Skills in the UK Food and Drink Manufacturing Sector: Stage 1 of the Sector Skills Agreement: Demand Drivers, op cit, section 3.2, page 10

[10] Recipe for Success — Scotland's National Food and Drink Policy, Scottish Government, June 2009

[11] Food 2030, DEFRA, January 2010

(i) The sector is diverse. It covers a wide range of food products such as bakery, meat and fish, beverages and dairy produce. Bakery is the dominant sub-sector in the UK and in Scotland.[12]

(ii) Although most businesses in the sector are small, employment is concentrated in a few large firms: 60% of employees in the sector work for companies employing more than 200 people.[13]

(iii) The industry has to respond to rapidly changing consumer demands, often mediated through large supermarkets which require food manufacturers to meet orders which can change on a daily basis and must be delivered as late as possible to minimise storage and other costs.[14]

(iv) Food products can, if proper safeguards are not taken, damage the health of consumers in ways which can be fatal.[15] This means that regulation is a key aspect of the industry.

(v) Food production and consumption can have significant implications for society as a whole. Concerns about health and nutrition for example can impact directly on food businesses.[16]

(vi) The industry has a history of being ready to adapt to new technology to meet customer expectations.[17]

The food and drink industry is also characterised by a number of trends and counter trends which can appear, in some ways, to be contradictory. For instance, while there is increasing concern about health and nutrition, the consumption of 'junk food' remains unaffected. Another example is global sourcing by food businesses while, at the same time, consumers think locally and seem to wish to continue to access local and regional variations through farmers' markets and other outlets.[18]

From factors such as the above, four drivers for change in the food and drink industry in the future can be identified.[19] They, too, affect the design of any new course for potential entrants to the industry. They are:

♦ consumer change — stemming from changes in incomes, population, tastes and lifestyles among consumers

♦ changing technology — this covers new products and processes but also includes new storage and distribution systems

♦ market power — this includes increased market concentration among retailers which, coupled with globalisation, can lead to new routes to market

---

[12] The Food and Drink Manufacturing Sector in Scotland: Labour Market Information Profile 2009 - 10, op cit

[13] Demand for Skills in the UK Food and Drink Manufacturing Sector: Stage 1 of the Sector Skills Agreement: Demand Drivers, op cit, section 3.4, page 13

[14] Demand for Skills in the UK Food and Drink Manufacturing Sector: Stage 1 of the Sector Skills Agreement: Demand Drivers, op cit, section 4.1, page 18

[15] ibid

[16] ibid

[17] Demand for Skills in the UK Food and Drink Manufacturing Sector: Stage 1 of the Sector Skills Agreement: Demand Drivers, op cit, section 3.1, page 8

[18] Demand for Skills in the UK Food and Drink Manufacturing Sector: Stage 1 of the Sector Skills Agreement: Demand Drivers, op cit, section 4.2

[19] Demand for Skills in the UK Food and Drink Manufacturing Sector: Stage 1 of the Sector Skills Agreement: Demand Drivers, op cit, section 4.3 page 19

♦ continuing regulation — this covers factors such as health and nutrition, international trading patterns and the environment all of which are the subject of national and international regulation

Overall, therefore, food and drink manufacturing is an important industry in Scotland and the UK. Government policy in Scotland and the UK as a whole, through Recipe for Success and Food 2030, has been introduced to try to ensure that this situation continues in the future. Of itself, this could justify the development of a course to prepare people to enter the industry. This brief survey of the industry has shown also that the nature of the industry is such that any new course has to take account of the particular characteristics of the industry. It must also ensure that successful candidates are ready to play a part in enabling the industry to cope with the challenges it will face in the future.

2.2 Shortage of skilled and technical personnel

The current situation in the food and drink industry provides a further justification for the new award. Present estimates and forecasts indicate that the industry is experiencing, and will experience, a shortage of suitable people to meet the requirements of food businesses. The Improve (2006) report, Demand for Skills in the UK Food and Drink Manufacturing Sector: Stage 1 of the Sector Skills Agreement: Demand Drivers, states specifically: 'There is a shortage of technical (food scientists and technologists, engineers, electricians) and skilled workers (bakers, butchers, fishmongers, cheese makers) and employers report clear skills issues at management and supervisory levels — especially in operational people management and softer skills such as leadership, motivation and confidence building. These problems are evident across the whole UK food and drink manufacturing industry.' [page 3]. The report also points out that if the sector is to boost its industry its productivity and competitiveness, 'the quality and supply of technical, practical and craft skills must be increased.' [20]

The shortage of food scientists and technologists in particular is further emphasised by a survey in 2006 based on 170 interviews with businesses in the food and drink sector.[21] It found that 53% of food and beverage companies have a vacancy for food scientists or technologists. It noted also that 'food scientists and technologists are an important and significant occupational group within the sector'.[22] The study estimated that there are 8,650 food science and technology roles in the UK, the bulk of which are posts with manufacturers/producers. Examples of the roles involved included 'quality assurance', 'production', 'process control' and 'management'.[23] The study concludes that up to one in four food science and technology roles were vacant.[24]

---

[20] The Supply of Training and Skills with the UK Food and Drink Manufacturing Sector: Stage 2 of the Sector Skills Assessment: Assessment of Current Provision, Improve (2006), page iii

[21] Research to Investigate the UK Requirement for Food Scientists and Technologists, Summary Report, Improve 2006

[22] op cit page 8

[23] ibid

[24] op cit page 9

The current shortage of technical personnel is likely to be exacerbated in the future. Estimates suggest that replacement demands will mean that the industry will need to recruit about 118,000 workers in the period to 2014. Forecasts indicate also that there will be a transition to a higher skills level workforce.[25] In common with other employment sectors, the food and drink industry is affected by changing age profile of the UK population. This means that a higher proportion of employees are eligible to retire from the industry than might otherwise have been the case. This, in turn, means a greater demand for staff to replace those leaving.[26]

In conclusion, therefore, there is presently a shortage of skilled people to fill positions in food science and technology in the food and drinks industry. The HND Food Science and Technology can be justified as a direct response to these current and future shortages of food scientists and technologists.

2.3 Industry efforts to address the shortage of skilled and technical personnel

The actual and potential shortages of skilled personnel have been recognised by the industry which has made a number of efforts to encourage people to pursue careers in the food industry and take up suitable courses. These provide further evidence of the need for the HND Food Science and Technology because gaining a suitable qualification establishes a foundation on which people can build a successful career in the food industry, especially in scientific and technical positions. As the only award at HND level in Scotland, the proposed HND Food Science and Technology is likely to have a key role to play if these initiatives are to succeed.

Improve in Scotland has made a number of attempts to encourage people to take up careers in the food industry. For instance, a press release in late 2007 aimed at school leavers pointed out 'if you go to specialise in food science, you are going to be in high demand'.[27] Other examples of career publications from Improve are a case study of Martha McCulloch[28], a former student at Glasgow Metropolitan College, and a leaflet explaining the work of a food scientist/technologist[29].

Another indication of the seriousness with which the industry views the potential shortage of skilled personnel is the establishment of the Education, Food and Drink Partnership (EFD Partnership) based at the University of Abertay, Dundee. It was founded in 2006 and was the Outcome of a strategic initiative led by the University of Abertay and funded by the Scottish Funding Council in which a group of Universities and Colleges examined food and drink education in higher and further education in Scotland.

---

[25] Demand for Skills in the UK Food and Drink Manufacturing Sector: Stage 1 of the Sector Skills Agreement: Demand Drivers, op cit page 3

[26] Investigation into the Impact of an Ageing Workforce on the Food and Drink Manufacturing Industry, Improve, 2006

[27] News Release Improve 21 November 2007 (quote from Operations Manager, Kelvin Thomson)

[28] Martha McCulloch, Improve press release, 16 February 2009

[29] Food Scientist/Technologist, Improve, undated careers leaflet

The partnership consists of key education providers which support the food and drink industry in Scotland and includes, among others, the University of Abertay, Glasgow Caledonian University, Scottish Agricultural College, Glasgow Metropolitan College, Dundee College and Forth Valley College. The 2006 Report which led to the founding of the EFD Partnership drew attention to the declining numbers of FE and HE providers in Scotland and to the fact that the number of skill shortage vacancies in the food and drink industry is higher than the number of candidates embarking on educational courses relevant to the industry. [30]

There is still further evidence of the importance attached by the industry to attracting young people as a means of tackling the shortage of skilled personnel. The Scottish Food and Drink Federation (SFDF) are involved in a number of initiatives, often funded by the Scottish Government, to encourage young people to pursue a career in the food industry. These follow largely from 'Recipe for Success' — referred to earlier in section 2.1.

In 2009, the Federation launched a careers film, 'World of Opportunities'[31]. This is aimed at careers advice professionals, schools, colleges and private training providers as well as food companies. It features contributions from many of the leading food manufacturing companies in Scotland. In February, 2010, the Federation announced that it had received a grant of £180,000 from the Scottish Government to run a national programme aimed at promoting the food and drink manufacturing industry to children and young people[32]. The programme is intended to establish the food and drink industry as a 'career destination of choice' and will involve the setting up of an Advisory Group of key partners and stakeholders including representatives from Skills Development Scotland, Learning and Teaching Scotland, Improve Ltd and the Scotland Food and Drinks Skills Academy.[33]

An example of attempts to attract young people into the food and drink industry and to enhance the image of the industry is a competition organised by the RHASS (Royal Highland Agricultural Society of Scotland) and run in conjunction with the Royal Highland Show in June 2010. Described as the 2010 RHASS President's Initiative the competition is called 'The Royal Highland Show Discover Careers... from Farm to Fork'. It was open to people aged 16–25 working in groups of four. Entrants had to choose a food, highlight the processes required to produce it and the skills employed in each process.

Furthermore, as confirmed by the Royal Environment Health Institute of Scotland (REHIS), in order to pursue a career as Food Safety Officer (FSO) in Scotland, individuals must meet the Scottish Food Safety Officers' Registration Board's pre-registration academic standards. At the time of writing, this includes their demand that applicants for the Higher Certificates in Food Premises Inspection (HC in FPI) and Food Standards Inspection (HC in FSI) require a minimum of an HND in Food Science or Food Technology.

---

[30] Presentation by Dr Daan Kiezebrink, EFD Partnership, to the Food Advisory Board at Glasgow Metropolitan College, 5 May 2009

[31] available on YouTube

[32] SFDF, press release, 19 February 2010

[33] ibid

The need for the HND in Food Science and Technology is heightened by the efforts being made to encourage people to pursue a career in the food and drinks industry. This is because the HND represents one of the ways in which those wishing to pursue a career in the food and drink industry can turn their aspirations into reality. The HND in Food Science and Technology complements the efforts of Improve, the SFDF, REHIS and others by offering an entry route into the industry.

2.4   Employer consultation

The above research suggests that there will be significant employment opportunities for people who have qualifications in food science and technology. It does not, however, necessarily demonstrate that the proposed HND in Food Science and Technology is a suitable award. It does not show that the new award will actually meet the needs of employers in the food and drink industry and enable candidates to develop the skills, knowledge and understanding which they will need to take advantage of these opportunities. For this reason, with the assistance of Improve, specific research on the new awards — at HNC and HND level — was carried out on behalf of the QDT.

In order to ensure that the proposed developments of the HNC and HND met the needs of employers the consultation was undertaken at the start of the staged development during October 2008. Representatives from 33 food businesses with operations in Scotland replied. This is a respectable return for a survey of this nature and respondents included many of the major employers in the industry. All those who replied said that they would be prepared to consider a holder of the HN award in food science and technology for employment. Question 2.1b of the consultation asked respondents to indicate the types of posts which holders of an HND might take up in their organisations. Examples included food technologist, quality control manager, senior technologist and working in new product development. Question 2.1b also asked about job opportunities for candidates who exited with an HNC Food Science and Technology. Comparing the two lists demonstrates that, in general, employers expect holders of an HND to take up more responsible positions than those with an HNC.

The survey, therefore, provides evidence that the proposed HND will meet the requirements of employers for the type of technical jobs for which there is a shortage. The survey also gives an indication of the types of jobs which will be open to successful candidates. For holders of an HND, posts in quality assurance were very strongly mentioned. The consultation also provided support for the proposed structure of the HND. This is explored more fully in section 4 of this document.

This formal consultation for the development of this HND award has been supplemented by anecdotal and other evidence, much of it drawn from the experience of members of the QDT, their contacts and their networks within the food and drink industry in Scotland. By its very nature this is difficult to record and quantify but the main message is that it would be to the detriment of the food and drinks industry in Scotland if the locally devised HND Food Technology were to lapse and not be replaced. An HND award can also (as outlined earlier) provide the first step towards professional work within the food and drink industry, such as that undertaken by REHIS.

2.5   Other related provision

It has been shown that there is a demand for food scientists and technologists from the food and drink industry and that there is also evidence that employers believe that the HND in Food Science and Technology will meet this demand. There is, therefore, a justification for the new award.

However, the case for a new award does not depend solely on demand factors. It is also affected by supply side considerations. It is important, therefore, to consider other provision in this area.

Previously, the Scottish Agricultural College (SAC) offered equivalent awards. SAC revalidated its HNC/HND Food Technology in 1996 and again in May 2003 when the course title was changed to HNC/HND Food Science and Technology. However, SAC made the decision not to revalidate for October 2007 using the new design principles. Also, in the past, there have been related awards at HNC level including HNC Baking Technology, HNC Craft Bakery Production and HNC Supervisory Management for the Food Industry. In addition, there was an HND in Baking Technology and Bakery Process Management. However, all of these awards have been discontinued. This document has already drawn attention to the fact that the HNC Food Science and Technology (G9DD 15) has already replaced the locally devised HNC Food Technology (G1EH 15). And now the HND in Food Science and Technology (G9PX 16) replaces the previous locally devised HND in Food Technology (G2DY 16).

Therefore at the time of writing, the HNC/HND in Food Science and Technology are the only national awards in this occupational area in Scotland. There are no equivalent locally devised awards.

Degree courses linked to the food and drink industry are offered by four Higher Education Institutions in Scotland. The provision is summarised below:

HE Institution	Courses Relevant to the Food and Drink Industry
Glasgow Caledonian University	BSc/BSc Hons. Food Bioscience
Scottish Agricultural College	BSc/BSc Hons. Applied Bioscience (Food Science)
University of Abertay	BSc/BSc Hons. Food and Consumer Science BSc/BSc Hons. Food Nutrition and Health BSc/BSc Hons. Food Product Design DipHE Food and Consumer Studies (NB — the 3 degree courses have a common programme in years 1 and 2 which is equivalent to the DipHE)
Heriot Watt University	BSc Food Science and Management

The emphasis of these courses varies and, as a result, so does the content. There is limited emphasis in the first two years of all these programmes on food processing and food production technology.

Currently, therefore, at HND level there are no awards which are the direct equivalent of the proposed HND Food Science and Technology. However, there are other courses which aim to prepare candidates for entry into the food and drinks industry. This indicates that the demand from the food and drink industry for suitably qualified personnel was not being fully met by the supply of courses, thus reinforcing the case for the HND in Food Science and Technology.

The lack of suitable courses is a matter of concern to the food and drinks industry. A conference sponsored by Improve in September 2008 noted 'the fragility of supply provision of quality food scientists and technologists' and that the industry is 'becoming more dependent on recruiting food scientists and technologists from overseas because we cannot train or attract enough from within our own educational institutions'. [34] The formation of the Education Food and Drink Partnership illustrates that this concern is shared by educational providers and industry.

The actions of the Scottish Food and Drink Federation to attract young people into the food industry also depend for their success on the existence of suitable courses and awards. If a suitable range of course provision for the food and drink industry is not available then the efforts of the Federation and others may be less successful than might otherwise be the case. The absence of suitable courses and awards may deter some young people who might otherwise have seriously considered a career in the food industry.

2.6 Current and recent provision in Food Technology at HN level

The following table, taken from official SQA statistics, gives details of number of awards in HNC and HND Food Technology over recent years. The data before 2005/6 covers two locally devised HN awards in Food Technology; one offered at Glasgow Metropolitan College and the other by Scottish Agricultural College (SAC). SAC discontinued its award which did not operate after 2005/6.

Year Award	2000/1	2001/2	2002/3	2003/4	2004/5	2005/6	2006/7	2007/8	2008/9
HNC Food Tech	2	0	7	4	5	5	2	3	2
HND Food Tech	15	5	15	20	29	12	23	3	13

This table emphasises that most candidates progress from the HNC to the HND and that, for most candidates, an HND is the intended exit point.

---

[34] The Future of Food Science and Technology: A Summary, Improve 2008, page 8

Further information has been gathered on 11 candidates who completed the HND Food Technology at Glasgow Metropolitan College in 2008 and the post-HND destinations of these are shown below:

Destination	No. of candidates
Employment in the food and drink industry	4
Further study in a course directly related to the food and drink industry	3
Further study in a course linked to manufacturing (Quality Assurance)	1
Non food and drink industry employment	2
Employment but in an unknown capacity	1

This supports the view that the current provision does fit candidates for employment in the food and drink industry. It also suggests that successful HND candidates who choose to progress to further study remain committed to employment in the food and drink industry. Although the numbers are small, the table reinforces the importance of providing an award at HND level which meets the needs of the food and drink industry.

The next table, also based on HND candidates from Glasgow Metropolitan College, gives some further destination information. It covers candidates who completed an HND in Food Technology during 2006 and 2007 and illustrates the type of employment openings which candidates can take up. In addition, it also supports the view that the previous award was able to supply trained personnel to the food and drink industry and that there is a strong background on which the proposed new HND Food Science and Technology can build.

Position	Industry Sector
Technical	Distillation; shellfish processing; sausage casing; plant bakery
Technologist	Poultry processing; sandwich production; frozen foods
Product Development	Fish smokers
Laboratory Analyst	Dairy; meat processing
Laboratory Manager	Microbiology company
Food Safety Officer	Local authority
Trainee Environmental Health Officer	(via University)
Health and Safety Officer	HSE
Home Economics Teacher	Education (via university)

2.7   Nature and Purpose of the Award

It is apparent from the foregoing that the HND in Food Science and Technology is intended to prepare candidates for employment in technical and scientific positions in the food and drink industry. The industry is currently experiencing a shortage of food scientists and technologists and this shortage is expected to continue. The HND is intended to build on the HNC Food Science and Technology and help to close this gap.

The HND in Food Science and Technology replaces an existing award which is no longer offered. There are few other post-school courses in Scotland aimed at the food and drink industry and this HND will prevent a further decline in the number of food and drink industry qualifications and courses available in Scotland. There are no HND awards directly equivalent to the new proposal currently offered by institutions based in Scotland. There are, in fact, no awards directly equivalent to the HNC Food Science and Technology either.

As well as meeting the needs of employers, the HND in Food Science and Technology must be attractive to potential candidates and provide a valid and engaging learning experience for those who elect to come on the award. The food and drink industry itself recognises that it 'does not have a very high profile among young people'[35] and the new qualification has been developed with this in mind and to try to address this problem. The measures exemplified in section 2.3 above also illustrate that the industry has to make, and is making, substantial efforts to persuade people to take up a career in the food and drink industry.

The HND in Food Science and Technology (G9PX 16) is rated at SCQF level 8. The HNC Food Science and Technology (G9DD 15) is at SCQF level 7 and is effectively the first year of the HND Food Science and Technology.

2.8 Title of the Award

In investigating the title of this award, there was agreement on the criteria. It must:

♦ accurately describe the award
♦ convey an image which is attractive to potential candidates

To ensure that both these criteria were met, considerable debate and consultation on possible titles were undertaken eg with the QDT; the Food Manufacture Advisory Board; the validation panel for the HNC award; representatives of the wider food industry in Scotland; potential and current candidates; the relevant professional body Institute of Food Science and Technology (IFST); employers etc.

Based on the results of this work, the QDT concluded that the title HND Food Science and Technology was the most appropriate title and meets the two criteria outlined above. It does fit the content of the award and work done with young people by the food industry, as well as the evidence gathered by the QDT, suggests there is a reasonable expectation that candidates will be attracted to the award. If candidates believe that there are worthwhile careers in the food industry, then the title of the award does provide a recognised description of what these careers could involve. Therefore the QDT concluded the title HND in Food Science and Technology is suitable to attract candidates. In addition, this title is consistent with the HNC award, which forms the first year of the HND award.

---

[35] News Release Improve 21 November 2007 op cit (quote from Operations Manager, Kelvin Thomson)

3 Aims of the Group Award

3.1 General aims of the Group Award

The general aims of the HND in Food Science and Technology are to:

1 provide a programme of study which will enable candidates to acquire the skills, capabilities, knowledge and understanding needed to contribute to the demand for trained personnel by employers in the food industry
2 enable candidates to further develop and enhance the study and research skills which will help them to become independent learners
3 enable candidates to evaluate key aspects of the operation of the food industry and draw justified conclusions from their evaluation
4 enable candidates to refine and extend their practical scientific and technological skills in line with industry standards
5 build on their existing transferable skills to further develop them in accordance with the standards expected by employers to ensure that they are prepared to function effectively in the dynamic contemporary labour market
6 enable candidates to progress within the Scottish Credit and Qualifications Framework (SCQF) to other higher education courses and/or to professional qualifications relevant to the food industry
7 provide candidates with a comprehensive overview and understanding of the technology, processes and products of food industry and the scientific, legal and cultural factors which influence the context in which they operate

3.2 Specific aims of the Group Award

The specific aims of the HND in Food Science and Technology are to:

1 prepare candidates for employment in a technical, scientific or future managerial positions in the food industry or in the regulatory sector
2 enable candidates to develop skills, knowledge and understanding of new product development in the food industry
3 enable candidates to build on their knowledge and understanding of food processing techniques and relate these to the post manufacturing supply chain and to food quality management in the modern food industry
4 enable candidates to apply their knowledge and understanding of food science to key aspects of the food industry such as sensory assessment of foods and food analysis
5 to enable candidates to further develop their knowledge and understanding of food chemistry and microbiology through the further examination of food composition and food quality and safety
6 provide the opportunity for candidates to apply their existing general skills, knowledge and understanding of food processing to the technology of specific sectors of the food industry
7 build on and further develop the practical skills that candidates have in laboratory work and in food technology required in the modern food industry
8 give candidates, through optional Units, the chance to develop skills, knowledge and understanding in areas which are of particular interest or relevance to them

3.3 Target groups

The target client group can be seen as those entering the 1st year of the two-year HND programme, ie those who wish to enter the food and drinks industry in a technical or scientific capacity and take up posts with some autonomy and responsibility. It is expected that this group will predominantly consist of young people who have recently left school either immediately prior to entering the course or after having completed a programme of suitable Units at National Certificate level.

However, the award would also be suitable for mature candidates wishing to return to further education or those currently in employment who could undertake the award on a part time basis.

It is expected that the target group will have an interest in working in a scientific/technical capacity and will probably have studied science or related subjects at school or elsewhere prior to beginning this award.

However, it is recognised that there may be candidates who are interested in working in the food and drink industry but who have a limited formal background in science and technology eg this could be the result of an individual changing her/his career aspirations so that school subject choices made earlier are no longer entirely appropriate for the new direction the individual now wishes to take. Bearing in mind the importance of attracting candidates to courses related to the food and drink industry, the new award has been designed to allow those in this category to form part of the target group for the award. An introductory science Unit (ie *F6VB 33 Science for the Food Industry: An Introduction* which is at SCQF level 6) has been developed and included as an optional Unit within the award to bring such candidates up to the required level with regard to science.

3.4 Employment opportunities

The first general aim of the HND in Food Science and Technology is to provide a programme of study which will enable candidates to acquire the skills, capabilities, knowledge and understanding needed to contribute to the demand for trained personnel by employers in the food industry. However, one of the key specific aims of the award is to prepare candidates for employment in a technical, scientific or future managerial position in the food industry or in the regulatory sector.

As outlined earlier, there is a shortage of suitable people to meet the requirements of food businesses. There is a shortage of technical (food scientists and technologists, engineers, electricians) and skilled workers (bakers, butchers, fishmongers, cheese makers) and employers report clear skills issues at management and supervisory levels — especially in operational people management and softer skills such as leadership, motivation and confidence building. These problems are evident across the whole UK food and drink manufacturing industry, with up to one in four food science and technology roles vacant. The current shortage of technical personnel is likely to be exacerbated in the future, with estimates suggesting that replacement demands will mean that the industry will need to recruit about 118,000 workers in the period to 2014. The HND in Food Science and Technology builds on the HNC in Food Science and Technology and is intended to help close these skills gaps.

Candidates who wish to take up employment on successfully completing the HND in Food Science and Technology could secure positions in food and drink manufacturing companies/organisations at supervisory and management level eg in new product development; laboratory supervision; quality assurance and auditing; production and warehousing; supply chain management; raw material and packaging procurement.

In addition, successful completion the HND in Food Science and Technology can open up employment opportunities for those who wish to pursue a career in food hygiene and inspection (eg as a Food Safety Officer)

4 Access to Group Award

4.1 Recommended access

Applicants for the HND Food Science and Technology should have completed an HNC in Food Science and Technology (or be in possession of an equivalent qualification at SCQF level 7. Therefore, the critical access point for an HND Food Science and Technology is the HNC Food Science and Technology. The access requirements for this HNC award are listed below.

Applicants for the HNC Food Science and Technology should have one of the following:

♦ One pass at an appropriate Higher Grade preferably Chemistry or Biology plus three Standard Grades in relevant subjects at band 3 or above
♦ One pass at appropriate Higher Grade preferably Chemistry or Biology plus passes in three NQ Course Units in relevant subjects at SCQF level 5 or above
♦ An appropriate group of National Certificate Units at SCQF level 5/6, such as the NQ Food Science and Technology
♦ Other equivalent qualifications or experience

The entry requirements for the HNC Food Science and Technology deliberately leave considerable discretion to the delivering centre — with the final category allowing applicants to be considered on an individual basis which can take into account particular circumstances, qualifications, experience and interests. This permits consideration of candidates who have an interest in a career in the food and drink industry and who have demonstrated a capacity and willingness to undertake an award at SCQF level 7.

However, there is also some centre discretion for direct entry into the HND Food Science and Technology, ie into the second year of the two-year programme. This discretion would be applied in the case of candidates who do not possess an HNC Food Science and Technology but who can produce valid evidence of successful study of relevant subject areas at SCQF level 7.

4.2 Core Skills entry profile

Candidates should have achieved the equivalent of the following Core Skills:

♦ *Communication* at SCQF level 6
♦ *Numeracy* at SCQF level 5
♦ *Information and Communication Technology* (ICT) at SCQF level 5
♦ *Problem Solving* at SCQF level 6
♦ *Working with Others* at SCQF level 5.

Candidates who do not have English as their first language should be able to demonstrate a facility with English equivalent to that of SQA Units at SCQF level 6 (ie Higher level) eg *F2VK 33 ESOL: Basic Operational Reading and Writing Skills* or, preferably, SQA Units at SCQF level 7 such as *F1HW ESOL for Work: Advanced Operational.*

The Core Skills entry profile for the HND Food Science and Technology would be achieved by candidates who have successfully completed an HNC Food Science and Technology.

The Core Skills entry profile for candidates embarking on year 1 of the HND programme requires that candidates should have achieved the equivalent of the following Core Skills:

♦ *Communication* at SCQF level 5
♦ *Numeracy* at SCQF level 4
♦ *Information and Communication Technology* (ICT) at SCQF level 4
♦ *Problem Solving* at SCQF level 4
♦ *Working with Others* at SCQF level 4.

Candidates entering year 1 who do not have English as their first language should be able to demonstrate a facility with English equivalent to that of SQA Units at SCQF level 5 such as *F1J0 40 ESOL: Developing Basic Listening and Speaking Skills* or *F1J1 40 ESOL: Developing Basic Reading and Writing Skills.*

5 Group Award structure

5.1 Framework

The structure of the HND in Food Science and Technology is as follows:

Unit code	Unit title	SQA credit value	SCQF level	SCQF credit points
Mandatory Units				
F6VF 34	Food Industry Principles: An Introduction	1	7	8
F6VE 34	Food Industry Practices: An Introduction	1	7	8
F6VG 34	Food Manufacturing: Processing Practices at Ambient Temperatures	1	7	8
F6VJ 34	Food Manufacturing: Processing Practices at Sub-Ambient Temperatures	1	7	8
F6VH 34	Food Manufacturing: Processing Practices at Elevated Temperatures	1	7	8
F4TL 34	Food Hygiene Intermediate	1	7	8
F6VD 34	Food Composition	1	7	8
F6VL 34	Microbiology of Foods 1	1	7	8
F6VM 34	Microbiology of Foods 2	1	7	8
F6VK 34	Legislation and the Food Industry	1	7	8
F6VC 34	Food Analysis	1	7	8
F7EW 34	Food Science and Technology: Graded Unit 1	1	7	8
F8L6 35	Food Manufacturing: Post Manufacturing Processes in the Food Chain	1	8	8
F8L8 35	Food Quality Management	1	8	8
F8L7 35	Food Product Development Principles	1	8	8
F8L3 35	Sensory Assessment of Foods	1	8	8
F8L9 35	Microbiology of Foods: Food Quality and Safety	1	8	8
F8L5 35	Food Composition: Raw Materials	1	8	8
F8L4 35	Food Analysis and Nutritional Labelling	1	8	8
F8XG 35	Food Science and Technology: Graded Unit 2	2	8	16
	Total Mandatory Credits	**21**		

Unit code	Unit title	SQA credit value	SCQF level	SCQF credit points
Optional Units [any 9 SQA credits]				
F6VB 33	Science for the Food Industry: An Introduction	1	6	8
DV9T 34	Fundamentals of Quality	1	7	8
J1BV 34*	Business Management: an Introduction	1	7	8
D85F 34	Using Software Applications Packages	1	7	8
F8M9 35	Food Manufacture: Technology of Meat and Fish Products	1	8	8
F8M6 35	Food Manufacture Technology of Milk and Dairy Products	1	8	8
F8M7 35	Food Manufacture: Bakery Technology	1	8	8
F8M8 35	Food Manufacture: Beverages Technology	1	8	8
F2EE 34	Pollution and Waste Management: An Introduction	1	7	8
F3X3 35	Data Collection and Handling	1	8	8
H8XT 33*	Statistics for Science 1	1	7	8
H8XV 34*	Statistics for Science 2	1	8	8
F7BX 34	Marketing: An Introduction	1	7	8
J1BT 34*	Supervision and Management	1	7	8
H8T2 33*	Workplace Communication in English	1	6	8
	Total Credits for HND	**30**		

The HND Food Science and Technology will be awarded to candidates who achieve the 21 mandatory SQA credits (168 SCQF credit points) and who achieve any 9 optional SQA credits from the list of optional credits (72 SCQF credit points).

Successful candidates will gain a total of 240 SCQF credit points from the HND Food Science and Technology. This will consist of:

♦ 72 SCQF credit points at SCQF level 8 from mandatory Units
♦ 96 SCQF credit points at SCQF level 7 from mandatory Units
♦ 72 SCQF credit points in various combinations of SCQF Levels 6, 7 or 8 depending on the optional Units successfully completed.

As already noted the HND Food Science and Technology is the second part of a two stage development. As a result, the structure of the HND builds on the framework approved for the HNC Food Science and Technology. **The structure of the HNC Food Science and Technology (G9DD 15) is given in Appendix 1.**

The remainder of this section considers a number of factors related to the structure of the award. They are:

♦   employer consultation and the structure
♦   balance between mandatory and optional Units
♦   choice of mandatory Units
♦   choice of optional Units
♦   aims and the structure
♦   relationship between the structure and the title
♦   Graded Unit
♦   national occupational standards

5.1.1   Employer consultation and the structure

The structure takes account of the feedback from the employer consultation. Respondents were asked to rate the value of possible subject areas for the HND food Science and Technology to those taking up a post within their organisation. The areas most highly rated as essential were:

♦   HACCP [rated as essential by 94% of respondents]
♦   Food Hygiene [92%]*
♦   Quality Assurance [91%]
♦   Food Legislation and Enforcement [82%]
♦   General Understanding of the Food Manufacturing Industry [73%]*
♦   Food Manufacturing at all Temperatures [53%]*
♦   Food Commodities [50%]
♦   Product Development [46%]
♦   Microbiology Principles and Practice [44%]*
♦   Management [43%]
♦   Sensory Assessment of Foods [37%]
♦   Food Composition and Analysis [37%]*
♦   Practical Pilot Plant Manufacturing [37%]*
♦   Understanding Basic Scientific Principles [33%]*

Topics marked * relate to the structure of the HNC Food Science and Technology.

The mandatory and optional Units in the HND Food Science and Technology therefore reflect directly the importance attached to them by respondents in the consultation as the following table shows. The Graded Units bring together the various subjects areas and ensure that, at the end of each year of the HND programme, candidates will be able to synthesise and integrate a number of different topic areas. The HND award as a whole reflects the balance of support indicated above.

The following table shows that all the mandatory Units in the HND Food Science and Technology are directly linked to topics which 85% or more of employers in the consultation rated as 'essential' or 'beneficial' to people in their organisations. It separates the HNC topics (which are taken first) from the HND topics in order to highlight the two stages of the HND award.

Consultation Subject	Relevant Mandatory Units	Relevant Optional Units
Food Hygiene	♦ Food Hygiene Intermediate	
General Understanding of the Food Manufacturing Industry	♦ Food Industry Principles: An Introduction ♦ Food Industry Practices: An Introduction	♦ Legislation and the Food Industry ♦ Business Management: An Introduction ♦ Fundamentals of Quality Using Software Applications Packages ♦ Pollution and Waste Management: An Introduction
Food Manufacturing at all Temperatures	♦ Food Manufacturing: Processing Practices at Ambient Temperatures ♦ Food Manufacturing: Processing Practices at Sub-Ambient Temperatures ♦ Food Manufacturing: Processing Practices at Elevated Temperatures ♦ Food Manufacturing: Post Manufacturing Practices	
Microbiology Principles and Practice	♦ Microbiology of Foods 1 Microbiology of Foods 2 ♦ Microbiology of Foods: Food Quality and Safety	
Food Composition and Analysis	♦ Food Composition ♦ Food Composition: Raw Materials ♦ Food Analysis ♦ Food Analysis and Nutritional Labelling	
Understanding Basic Scientific Principles		♦ Science for the Food Industry: An Introduction

Consultation Subject	Relevant Mandatory Units	Relevant Optional Units
HACCP	◆ Food Quality Management ◆ Microbiology of Foods: Food Quality and Safety	◆ Food Industry Practices: An Introduction ◆ Pollution and Waste Management: An Introduction
Quality Assurance	◆ Food Quality Management	◆ Fundamentals of Quality
Food Legislation and Enforcement	◆ Legislation and the Food Industry	◆ Food Industry Principles ◆ Food Hygiene Intermediate
Product Development	◆ Food Product Development Principles ◆ Sensory Assessment of Foods ◆ Microbiology of Foods: Food Quality and Safety ◆ Food Analysis and Nutritional Labelling	
Food Commodities		◆ Food Manufacture: Meat and Fish Technology ◆ Food Manufacture: Dairy Technology ◆ Food Manufacture: Bakery Technology ◆ Food Manufacture: Beverages Technology
Management		◆ Business Management: An Introduction ◆ Supervision and Management ◆ Marketing: An Introduction
Sensory Assessment of Foods	◆ Sensory Assessment of Foods	◆ Data Collection and Handling ◆ Statistics for Science 1 ◆ Statistics for Science 2

Practical work which includes the use of pilot plant equipment, as well as laboratory work, has been incorporated into many of the Units in the HND. This is to emphasise the close link between knowledge and understanding and the development of practical skills relevant to the food and drink industry.

The consultation also provided support for the prevailing view among QDT members, ie they were firmly of the view, based on substantial experience of the food and drink industry, that food processing and the necessary underpinning scientific knowledge and understanding should be at the heart of this award.

It is worth pointing out also that the structure is consistent with views expressed by the Food Manufacture Advisory Board at Glasgow Metropolitan College. At its meeting on 16 September 2008, for example, it agreed that an introductory Unit covering the role of the food and drink industry would be essential. The 2 Units, *Food Industry Principles: An Introductio*n and *Food Industry Practices: An Introduction*, are designed to provide this essential background for candidates. They have been developed in such a way that they can be delivered at an early stage of the award. A subsequent meeting of the Food Manufacture Advisory Board on 5 May 2009 approved the adoption of this approach. There has been a positive response to the structure approved for the HNC which is a key part of the HND award. This helps to confirm that the structure of the HND Food Science and Technology will meet the requirements of the food and drink industry in Scotland.

5.1.2 Balance between Mandatory and Optional Units

The employer consultation was a significant influence on the way in which the HND Food Science and Technology has been structured, particularly the decision on whether a topic should be included and whether it should form part of the mandatory or the optional Units in the award.

An important aspect of this HND is that candidates should be able to build on work that they have undertaken during the first year of the award. In this way they can extend and refine the skills, knowledge and understanding which they have developed. In addition, the greater scope of the HND allows for a wider range of mandatory Units. For this reason, some Units which are optional in the HNC have been made mandatory in the HND. This also ensures that HND candidates will be given a more comprehensive grounding in food processing practices and principles, as well as in food science. The overall intention of the QDT, therefore, was that the mandatory Units would be consistent with the findings of the employer consultation and that they would provide candidates with a strong foundation on which to build a career in the food industry.

The QDT also took other factors into account when determining the way in which the award was structured between mandatory and optional Units:

♦ Firstly, it was felt that the candidates should have some discretion to select Units which would match their particular preferences particularly in terms of anticipated career development. It is primarily for this reason, for example, that the four 'sector Units' (eg *Food*

Manufacturing: Dairy Technology) are optional. A similar conclusion was reached with respect to Units in business and management.

♦ Secondly, a mandatory and optional structure gives some flexibility to the award. It is relatively straightforward, for example, to incorporate into the award additional optional Units in the future which may meet changing industry requirements.

♦ Thirdly, it was felt that any choice of optional Units had to be meaningful in terms of the amount of choice that candidates could have.

Taking all these factors into account resulted in a structure of 21 mandatory credits, including the two Graded Units. This leaves nine optional credits – approximately one third of the whole award. The QDT believe that this was a good degree of flexibility and choice, particularly as the options could be directly related to specific career aspirations which candidates might have.

5.1.3 Choice of Mandatory Units

The QDT also had to decide which Units would be used to meet the topic areas chosen for the mandatory section of the HND Food Science and Technology. In doing this, the QDT had to bear in mind that this is a specialised award and there are no equivalent awards currently available at HNC or at HND level. In addition, Units from previous awards were written in a Unit format no longer used by SQA.

In this situation, the only feasible way forward for most mandatory Units was to develop new Unit specifications. For the HND stage of the development, it was possible to make use of new Units written for the development for the HNC Food Science and Technology. These Units were validated as part of the HNC Food Science and Technology. In fact, the vast majority of mandatory Units in the proposed HND have been specially written for the award.

The only exception is *F4TL 34: Food Hygiene Intermediate*. This Unit is particularly suitable for inclusion in the HND — it is also a mandatory Unit in the HNC. The aim of the Unit is to develop knowledge and understanding of food safety which means that it would meet key specific aim of the HND (ie specific aim 1) as well as matching the findings of the employer consultation. In addition, this Unit is equivalent to the REHIS Intermediate Food Hygiene Certificate. It thus enhances and adds value to the HND Food Science and Technology as successful candidates will gain professional recognition in an area of critical importance to the food and drink industry. This can open up employment opportunities for candidates who may wish to pursue a career in food hygiene and inspection. In addition, it is clear from the information noted earlier, that this is a career path which appeals to some candidates. Also REHIS confirm that applicants for HC in FPI and HC in FSI require an HND in Food Science and Technology as a minimum.

5.1.4   Choice of Optional Units

The QDT had to consider which Units to include as available options. A number of different criteria were used:

a   there is a need to ensure that candidates who may lack suitable background, especially in scientific subjects, are able to cope with the demands of the HND
b   there should be opportunities for candidates to develop general transferable skills, knowledge and understanding which will be of value to them as candidates and as future employees
c   there should be opportunities for candidates to further develop the skills, knowledge and understanding gained in the mandatory Units
d   there should be opportunities for candidates to develop skills, knowledge and understanding which would help them enhance their attractiveness to potential employers

These various criteria overlap and several of the optional Units meet more than one of them as the following table shows.

Optional Unit	Criterion for Optional Units			
	a	b	c	d
Science for the Food Industry: An Introduction	✓			
Fundamentals of Quality		✓	✓	✓
Business Management: An Introduction		✓		✓
Using Software Applications Packages		✓		✓
Food Manufacture: Technology of Meat and Fish Products			✓	✓
Food Manufacture: Technology of Milk and Dairy Products			✓	✓
Food Manufacture: Bakery Technology			✓	✓
Food Manufacture: Beverages Technology			✓	✓
Pollution and Waste Management: An Introduction		✓		✓
Data Collection and Handling	✓	✓	✓	✓
Statistics for Science 1		✓	✓	✓
Statistics for Science 2		✓	✓	✓
Marketing: An Introduction		✓		✓
Supervision and Management		✓		✓
Workplace Communication in English	✓			

As already noted some Units which are optional in the approved HNC Food Science and Technology are mandatory in the HND.

The application of the four criteria can be illustrated by taking each in turn.

Criterion a — there is a need to ensure that candidates who may lack suitable background, especially in scientific subjects, are able to cope with the demands of the HND.

There were concerns that some candidates may come to the HND with an interest in pursuing a career in the food and drink industry but lacking sufficient background in scientific subjects, particularly Biology and Chemistry. This may prejudice their ability to successfully complete some of the mandatory Units taken during the first year of the programme – in particular *Microbiology of Foods 1* and *Food Composition 1*. To solve this difficulty, a solution was adopted which is used in other SQA science and technology based awards at HN level (such as the HNC Applied Sciences) – namely introductory Units at SCQF level 6 are included in the HN framework as optional Units. For instance, the HNC Applied Sciences has in its framework a Unit at SCQF level 6, *DX29 33: Fundamental Chemistry: An Introduction*. Candidates who enter the award without a suitable grounding in science or technology are able to take introductory Units like this in order to gain the skills, knowledge and understanding needed for entry into mandatory science or technology based Units. These introductory Units are pitched at SCQF level 6 and it is expected that candidates who already have suitable achievements in the subjects concerned will not take these options. However, this solution has the merit of enabling candidates who will benefit from Units like this to get credit for the work they do. It has additional benefits also. It widens access to the award which, as has been shown, is important for courses targeted at the food and drink industry. It also reduces the possibility that candidates will be discouraged by having to undertake additional preparation for some Units. The specialist nature of the HND Food Science and Technology meant that again it was necessary to develop a Unit specifically designed to provide fundamental scientific skills, knowledge and understanding for the food and drink industry.

The Unit *F6VB 34 Science for the Food Industry: An Introduction* was prepared and validated as part of the first stage of the development of HND Food Science and Technology. This is because the above argument applies also to the HNC Food Science and Technology. The expectation is that once candidates have successfully built up their knowledge and understanding to the requisite level they will be able to progress through the various food science Units. Candidates who have completed *F6VL 34: Microbiology of Foods 1*, for example, should be adequately equipped to move on to *F6VM 34: Microbiology of Foods 2.*

The other example of an optional Unit which has been included to help candidates who may lack suitable skills is *DE1K 33: Workplace Communication* in English. This should help to ensure that candidates for whom English is not their first language are able to cope with the award and able to seek employment in the UK when they have completed it. Migrant workers play an increasingly important role in the food and drinks industry[36].

Criterion b — there should be opportunities for candidates to develop general transferable skills, knowledge and understanding which will be of value to them as candidates and as future employees.

---

[36] The Food and Drink Manufacturing Sector in Scotland: Labour Market Information Profile 2009 - 10, op cit

Candidates should have the chance to develop transferable skills; knowledge and understanding which may help them gain employment and also help them during their study for the HND. Skills in information communication technology are a particularly good example of this. *D85F 34: Using Software Applications Packages* is a well established SQA Unit used in a number of HN awards. It is practically oriented and enables candidates to develop ICT skills in using software, eg spreadsheets and presentation software. *F2EE 34: Pollution and Waste Management: An Introduction* is another example. This is another well-established SQA Unit which can help candidates recognise the impact of pollution and the importance of waste management in manufacturing industry and elsewhere.

Criterion c — there should be opportunities for candidates to further develop the skills, knowledge and understanding gained in the mandatory Units.

Optional Units can enable candidates to further develop skills, knowledge and understanding from mandatory Units. The best examples here are the four 'sector Units' which look at the key sectors of the food industry (ie bakery; milk and dairy; beverages; meat and fish). Each of these four Units allows candidates to apply skills, knowledge and understanding gained in other Units to the specific context of a key sector of the food and drinks industry. The decision to make them optional allows candidates to choose whether they wish to explore a particular sector or sectors and which sector(s) they wish to concentrate on.

Criterion d — there should be opportunities for candidates to develop skills, knowledge and understanding which would help them enhance their attractiveness to potential employers.

Optional Units should also offer the chance for candidates, who wish to do so, to develop further skills which may enhance their prospects for employment after the HND. The four 'sector Units' mentioned above also meet this criterion as candidates can choose Units which fit with their preferred choice of career. It was also felt that existing SQA Units could also be added to the framework as options as they too could help candidates develop further appropriate skills. Examples include *F5CP 34: Supervision and Management* while *F7BX 34: Marketing: An Introduction* would allow candidates who also opted for *F1RJ 34: Business Management: An Introduction* to build on the work they had done in this Unit. These three Units provide a coherent suite of Units which could help candidates develop a strong practical awareness of business and management. The Units, *DN8C 34: Statistics for Science 1* and its successor, *DV08 35: Statistics for Science 2*, plus *F3X3 34: Data Collection and Handling* form another small suite of connected optional Units which would be appropriate for candidates interested in quality assurance and sensory assessment for example.

5.1.5 Aims and the structure

Another key factor affecting the structure is that the Units comprising the award should enable candidates to meet the aims of the award. The tables at Section 5.2 show how the general and specific aims of the HND in Food Science and Technology match to the Units which make up the award.

These tables confirm that all the aims of the award will be met by the mandatory Units. The optional Units provide further means by which some aims can be met. This depends, of course, on which options a candidate attempts.

5.1.6 Relationship between the structure and the title

The structure of the HND Food Science and Technology must be consistent with the title of the award. The difficulties of choosing a suitable title were outlined earlier. The HND contains Units which directly cover Food Science (eg Microbiology of Foods 1 and 2, Microbiology of Foods: Food Quality and Safety, Food Composition 1; Food Composition: Raw Materials; Food Analysis) and Technology (the three food manufacturing Units; Food Manufacturing: Post Manufacturing Processes; Food Quality Management) while other mandatory Units (Food Industry Principles: An Introduction, Food Industry Practices: An Introduction, Legislation and the Food Industry, Sensory Assessment of Foods, Food Product Development Principles and the two Graded Units) include both food science and food technology topics. In this way, therefore, the title does match the structure of the HND.

The title is also compatible with the findings of the employer consultation in that the five topics rated as most valuable (with a rating of 70% or higher) can all be grouped under the heading of 'food science and technology'.

5.1.7 Graded Unit

As required by the SQA Design Principles, the HND Food Science and Technology contains 2 Graded Units, ie Graded Unit 1 at SCQF level 7 is worth 8 SCQF credit points while Graded Unit 2 carries 16 SCQF credit points at SCQF level 8.

Both Graded Units are practical assignments designed to give candidates the opportunity to integrate the skills, knowledge and understanding they have developed by applying them to the food processing industry. Graded Unit 1 is a mandatory Unit in the HNC Food Science and Technology and its main aim is to 'provide candidates with an opportunity to undertake a project to demonstrate that they possess scientific and technological skills relevant to the contemporary food and drink industry'

The main aim of the practical assignment for Graded Unit 2 is similar and is: 'to provide candidates with an opportunity to undertake a project to demonstrate that they possess scientific and technological skills appropriate to the level of the award and which are directly relevant to the contemporary food industry'. For Graded Unit 2 candidates are required to choose a project which enables them to propose, develop and test a new food product. The output will be a final manufacturing specification for the new food product and the project should enable candidates to carry out practical work, to apply scientific principles and to draw conclusions.

The HND is designed to prepare candidates for posts in the food and drink industry and it was agreed Graded Units, based on practical assignments, were the best way to consolidate and integrate the various Units to be achieved during the two years of the HND programme.

It was also agreed that Graded Unit 2 should follow the pattern of Graded Unit 1 and ensure that candidates undertook practical work on food processing and applied some scientific principles. Graded Unit 2 covers both food science and technology and is consistent with the title of the HND.

Graded Unit 2 also follows the pattern set by Graded Unit 1 in that it focuses primarily on mandatory Units — in this case those which are undertaken as part of the HND framework and studied in Year 2 of the programme. This helps to ensure that the Graded Unit does not prejudice the status of optional Units. It is a mandatory Unit and including optional Units would effectively make them mandatory.

Graded Unit 2, again like Graded Unit 1, is designed to enable candidates to choose a project. This is a deliberate strategy as it allows candidates to choose a topic which is consistent with their interests and aspirations or current employment. For example, candidates could choose the development of a new product in an industry sector in which they hope to find employment or one where they currently work. There is also an opportunity for candidates to build on their experience of Graded Unit 1, taken at the end of the first year of the HND programme (as part of the HNC Food Science and Technology).

Graded Unit 2 thus adds variety and flexibility to the HND. Candidates will undertake this Unit towards the end of their HND which should ensure that they have the maximum opportunity to integrate the Units in the award. Graded Unit 2 also helps to develop the skills candidates will need in industry. They are obliged to draw conclusions from their project and, depending on the nature of their choice, may be able to make recommendations.

5.1.8 National Occupational Standards (NOS)

The national occupational standards (NOS) for the food and drink industry were also considered when developing the structure of the award. There is a range of SVQ and NVQ awards based on these NOS. These awards are designed for those working in the food and drink industry and many are linked directly to the skills development and training needs of sub-sectors in the industry. They are not, therefore, directly comparable to the aims of the HND in Food Science and Technology.

However, Improve, the Sector Skills Council for the food and drink industry, has developed a suite of Units based on the national occupational standards. This is part of the work associated with the introduction of Vocationally Linked Qualifications (VLQs) in England and Wales. These Units are at three different levels, with level 3 being the one which most closely matches HND. These Units have a more general focus than the specialised SVQ/NVQ Units and are intended to be used in courses preparing people for entry into the food and drink industry.

In many respects these Units represent a parallel development to the HNC/HND Food Science and Technology. Because they are linked to the NOS, it is possible to use them to show how the Units in the HNC/HND relate to the national standards. Appendix 2 shows the relationship between the HNC/HND Units and relevant Improve Units, most of which are at level 3.

The appendix has two tables: Table 1 covers all Units in the HND and refers to Improve Units which apply across the whole award. Table 2 is confined to Units which can be described as HND Units, ie those that are likely to be taken in Year 2 and attempted by candidates who have already completed sufficient Units to gain an HNC. Both tables in this Appendix show that there is a link between the HN Units and the Improve Units and, therefore, a link between the HND and the NOS. Table 2 illustrates that the HND Food Science and Technology provides a more comprehensive coverage of national occupational standards than the HNC.

5.2 Mapping information

5.2.1 HND Food Science and Technology: mapping of general aims to Units

The following table confirms that all Units in the HND in Food Science and Technology align to all the general aims of the award.

Unit code	Unit title	Aim 1	Aim 2	Aim 3	Aim 4	Aim 5	Aim 6	Aim 7
	Mandatory Units							
F6VF 34	Food Industry Principles: An Introduction	✓	✓	✓	✓		✓	✓
F6VE 34	Food Industry Practices: An Introduction	✓	✓	✓	✓		✓	✓
F6VG 34	Food Manufacturing: Processing Practices at Ambient Temperatures	✓	✓	✓	✓		✓	✓
F6VJ 34	Food Manufacturing: Processing Practices at Sub-Ambient Temperatures	✓	✓	✓	✓		✓	✓
F6VH 34	Food Manufacturing: Processing Practices at Elevated Temperatures	✓	✓	✓	✓		✓	✓
F4TL 34	Food Hygiene Intermediate	✓	✓	✓	✓		✓	✓
F6VD 34	Food Composition	✓	✓	✓	✓		✓	✓
F6VL 34	Microbiology of Foods 1	✓	✓	✓	✓		✓	✓
F6VM 34	Microbiology of Foods 2	✓	✓	✓	✓	✓	✓	✓
F6VK 34	Legislation and the Food Industry	✓	✓	✓	✓		✓	✓
F6VC 34	Food Analysis	✓	✓	✓	✓		✓	✓
F7EW 34	Graded Unit 1	✓	✓	✓	✓	✓	✓	✓
F8L6 35	Food Manufacturing: Post Manufacturing Processes in the Food Chain	✓	✓	✓	✓	✓	✓	✓
F8L8 35	Food Quality Management	✓	✓	✓	✓	✓	✓	✓
F8L7 35	Food Product Development Principles	✓	✓	✓	✓	✓	✓	✓
F8L3 35	Sensory Assessment of Foods	✓	✓	✓	✓	✓	✓	✓
F8L9 35	Microbiology of Foods: Food Quality and Safety	✓	✓	✓	✓	✓	✓	✓

5.2.1 HND Food Science and Technology: mapping of general aims to Units (cont)

Unit code	Unit title	Aim 1	Aim 2	Aim 3	Aim 4	Aim 5	Aim 6	Aim 7
	Mandatory Units (cont)							
F8L5 35	Food Composition: Raw Materials	✓	✓	✓	✓	✓	✓	✓
F8L4 35	Food Analysis and Nutritional Labelling	✓	✓	✓	✓	✓	✓	✓
F8XG 35	Graded Unit 2	✓	✓	✓	✓	✓	✓	✓
	Optional Units							
F6VB 34	Science for the Food Industry: An Introduction	✓	✓	✓	✓		✓	✓
DV9T 34	Fundamentals of Quality	✓	✓	✓	✓		✓	✓
FIRJ 34	Business Management: An Introduction	✓	✓	✓	✓		✓	✓
D85F 34	Using Software Applications Packages	✓	✓	✓	✓		✓	✓
F8M9 35	Food Manufacturing: Technology of Meat and Fish Products	✓	✓	✓	✓	✓	✓	✓
F8M6 35	Food Manufacturing: Technology of Milk and Dairy Products	✓	✓	✓	✓	✓	✓	✓
F8M7 35	Food Manufacturing: Bakery Technology	✓	✓	✓	✓	✓	✓	✓
F8M8 35	Food Manufacturing: Beverages Technology	✓	✓	✓	✓	✓	✓	✓
F2EE 34	Pollution and Waste Management: An Introduction	✓	✓	✓	✓		✓	✓
F3X3 35	Data Collection and Handling	✓	✓	✓	✓	✓	✓	✓
DN8C 34	Statistics for Science 1	✓	✓	✓	✓		✓	✓
DV08 35	Statistics for Science 2	✓	✓	✓	✓	✓	✓	✓
F7BX 34	Marketing: An Introduction	✓	✓	✓	✓	✓	✓	✓
F5CP 34	Supervision and Management	✓	✓	✓	✓	✓	✓	✓
DE1K 33	Workplace Communication in English	✓	✓	✓	✓		✓	✓

5.2.2 HND Food Science and Technology: mapping of specific aims to Units

The following table shows how the Units in the HND in Food Science and Technology align to all the specific aims of the award.

Unit code	Unit title	Aim 1	Aim 2	Aim 3	Aim 4	Aim 5	Aim 6	Aim 7	Aim 8
	Mandatory Units								
F6VF 34	Food Industry Principles: An Introduction	✓	✓			✓			
F6VE 34	Food Industry Practices: An Introduction	✓	✓			✓			
F6VG 34	Food Manufacturing: Processing Practices at Ambient Temperatures	✓					✓		
F6VJ 34	Food Manufacturing: Processing Practices at Sub-Ambient Temperatures	✓					✓		
F6VH 34	Food Manufacturing: Processing Practices at Elevated Temperatures	✓					✓		
F4TL 34	Food Hygiene Intermediate	✓			✓				
F6VD 34	Food Composition	✓			✓				
F6VL 34	Microbiology of Foods 1	✓			✓				
F6VM 34	Microbiology of Foods 2	✓			✓	✓			
F6VK 34	Legislation and the Food Industry	✓							
F6VC 34	Food Analysis	✓			✓				
F7EW 34	Graded Unit 1	✓					✓		
F8L6 35	Food Manufacturing: Post Manufacturing Processes in the Food Chain	✓	✓	✓	✓		✓	✓	
F8L8 35	Food Quality Management	✓		✓	✓	✓	✓	✓	
F8L7 35	Food Product Development Principles	✓	✓	✓	✓	✓	✓	✓	
F8L3 35	Sensory Assessment of Foods	✓			✓	✓	✓	✓	
F8L9 35	Microbiology of Foods: Food Quality and Safety	✓	✓	✓	✓	✓	✓	✓	
F8L5 35	Food Composition: Raw Materials	✓			✓	✓		✓	
F8L4 35	Food Analysis and Nutritional Labelling	✓	✓		✓	✓	✓	✓	
F8XG 35	Graded Unit 2	✓	✓	✓	✓	✓	✓	✓	✓

5.2.2 HND Food Science and Technology: mapping of specific aims to Units (cont)

Unit code	Unit title	Aim 1	Aim 2	Aim 3	Aim 4	Aim 5	Aim 6	Aim 7	Aim 8
Optional Units									
F6VB 34	Science for the Food Industry: An Introduction	✓							✓
DV9T 34	Fundamentals of Quality	✓	✓		✓				✓
FIRJ 34	Business Management: An Introduction	✓							✓
D85F 34	Using Software Applications Packages	✓		✓		✓			✓
F8M9 35	Food Manufacturing: Technology of Meat and Fish Products	✓		✓		✓		✓	✓
F8M6 35	Food Manufacturing: Technology of Milk and Dairy Products	✓		✓		✓		✓	✓
F8M7 35	Food Manufacturing: Bakery Technology	✓		✓		✓		✓	✓
F8M8 35	Food Manufacturing: Beverages Technology	✓		✓		✓		✓	✓
F2EE 34	Pollution and Waste Management: An Introduction	✓		✓					✓
F3X3 35	Data Collection and Handling	✓					✓	✓	✓
DN8C 34	Statistics for Science 1	✓					✓	✓	✓
DV08 35	Statistics for Science 2	✓					✓	✓	✓
F7BX 34	Marketing: An Introduction	✓					✓		✓
F5CP 34	Supervision and Management	✓					✓		✓
DE1K 33	Workplace Communication in English	✓							✓

5.3 Articulation, professional recognition and credit transfer

The following diagram illustrates possible progression and articulation routes from the HND Food Science and Technology. When considering the diagram, it is important to bear in mind some points which have been made earlier.

♦ The development of the HND Food Science and Technology is the second part of a two stage development leading to the introduction of both an HNC and an HND Food Science and Technology.
♦ For equivalent courses in the past, the anticipated exit point for most candidates is with an HND award.
♦ The HND Food Science and Technology has an emphasis on food production which differentiates it from other courses/awards preparing candidates for entry into technical and scientific posts in the food and drink industry.

Progression and articulation routes for HND Food Science and Technology
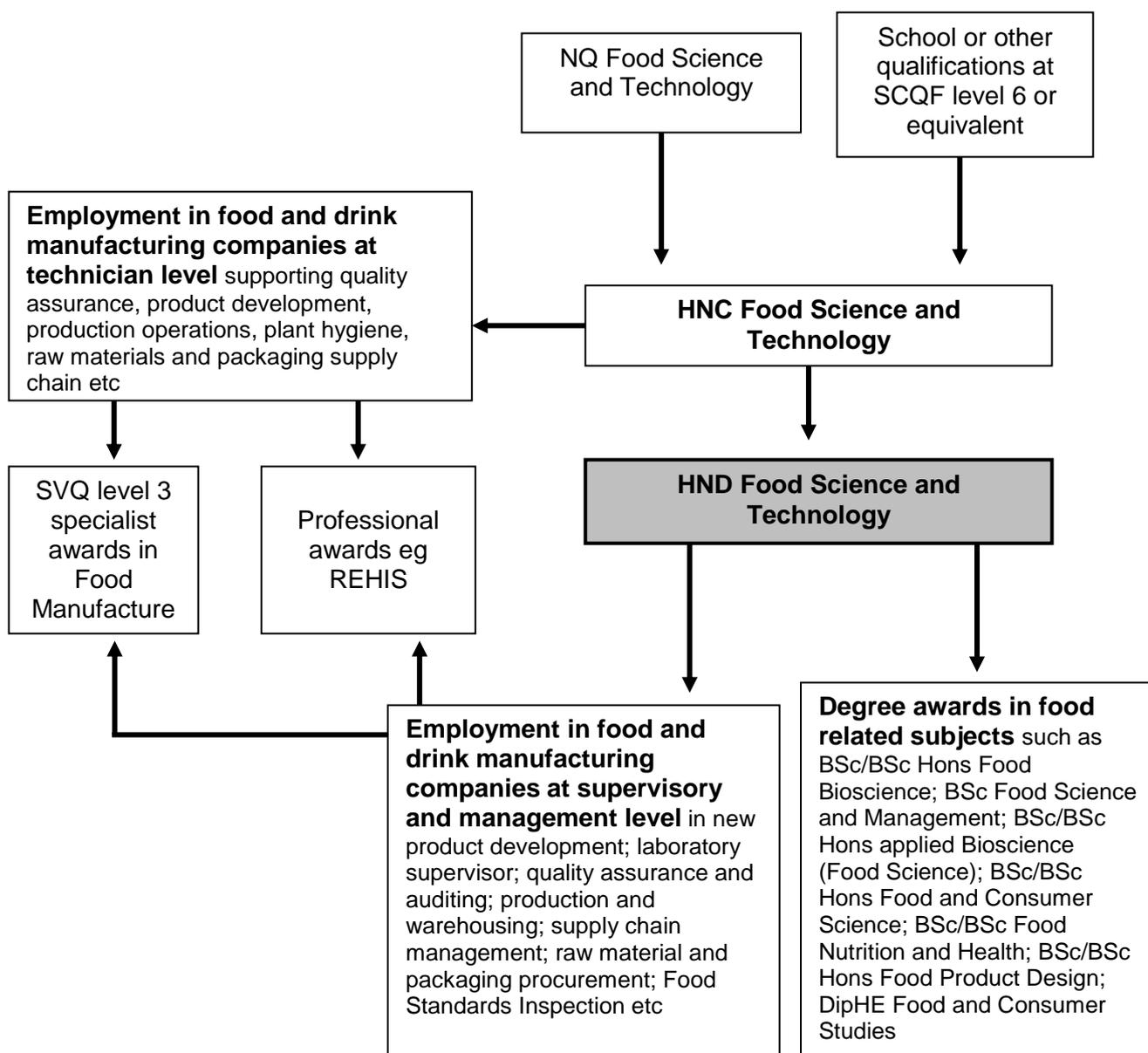
The diagram shows that candidates who enter the HND programme could exit into employment at the end of year 1, at which point they would be eligible for an HNC Food Science and Technology. However, it is expected (as borne out by past experience) that most candidates will complete the HND and exit after two years.

Candidates who do move into employment may take occupationally-related qualifications such as Scottish Vocational Qualifications (SVQs). There are a number of level 3 SVQ awards which seek to develop specialist skills in various aspects of Food Manufacture. SVQ awards may be more suited to candidates who exit with an HNC and who wish to develop particular specialist skills relevant to the position they have taken up. Nevertheless this is also a potential progression route for HND holders.

HND holders can also consider a professional progression route with bodies such as REHIS. As outlined earlier, the Unit F4TL 34: *Food Hygiene Intermediate* is equivalent to the REHIS Intermediate Food Hygiene Certificate; therefore candidates can gain professional recognition in an area of critical importance to the food and drink industry. This can open up employment opportunities for candidates who may wish to pursue a career in food hygiene and inspection. In order to pursue a career as Food Safety Officer (FSO) in Scotland, individuals must meet the Scottish Food Safety Officers' Registration Board's pre-registration academic standards. This includes their demand that applicants for the Higher Certificates in Food Premises Inspection (HC in FPI) and Food Standards Inspection (HC in FSI) require a minimum of an HND in Food Science or Food Technology.

In addition, achievement of this HND will allow candidates to qualify for student membership of the professional body Institute of Food Science and Technology (IFST), which means that they can become part of the professional community of food scientists and can benefit from the development opportunities that this can bring.

Candidates who wish to do so, may also progress into a degree programme targeted at the food and drink industry. The information on the 2008 cohort at Glasgow Metropolitan College given earlier shows that progression into Higher Education is a possible route for candidates who have completed an HND.

6 Approaches to delivery and assessment

6.1 Approaches to delivery

The delivery of the HND Food Science and Technology should reflect the main purposes of the award. The award seeks to develop underpinning skills and knowledge which will prepare successful candidates for entry into the food and drink industry. As a result (as discussed earlier), the award consists of a mixture of knowledge/understanding Units and practical Units. Where Units have been developed for this HN award, the aim has been to combine knowledge/understanding and related practical work in the same Unit, wherever possible. This means that delivery of the Units can be practically-oriented so that candidates are able to not only develop key practical skills in laboratory work, for example, but also can recognise the theoretical and conceptual ideas to which these skills relate.

Practical work also provides opportunities for candidates to work in groups. This is particularly likely in the mandatory food manufacturing Units. This has a number of benefits including the opportunity to gather evidence for the Core Skill of working with others and developing other 'soft skills' which employers value. HND candidates will be able to work on these skills during Year 1 Units and further develop them during their second year.

The Units developed for the HND, including those already approved as part of the HNC Food Science and Technology, are also closely related to the requirements of the food and drink industry. Throughout, the Units require candidates to consider how the material in them applies to the food and drink industry. This too will affect the methods of delivery used in the Units. It will be possible for candidates to go and find information for themselves, eg on new product development and the structure of the food and drink industry. On other occasions, delivery methods may involve exposition of material to candidates, perhaps as a precursor to practical work.

The emphasis on practical work in the delivery of the award has other benefits. It enables candidates to become aware of the vital importance of safe hygienic working practices; health and safety; cleaning and disinfection; and personal hygiene within the food and drink industry. In their practical work, both in food processing and in the laboratory, candidates will be expected to display good practice and this will lay the secure foundation which they will need to become successful members of the food and drink industry.

It is likely, therefore, that a range of delivery methods will be used for the HND Food Science and Technology. This should help to encourage candidates to see the relevance of the material they are studying and help to keep them interested and engaged. The range of different methods will offer a challenge to candidates and also help them to think for themselves.

In addition, it is important that delivery enables candidates to progress throughout the award. The order in which the Units are delivered can play a vital role in this — hence the award structure has been designed to permit this to take place. The actual programme followed will depend on the situation at the delivering centre but the structure suggests that delivery could follow a broad general pattern, along the following lines:

Year 1

♦ The two general Units — *Food Industry Principles: An Introduction* and *Food Industry Practices: An Introduction*, have been designed to be delivered at the start of the award. This should ensure that candidates are aware of the food and drink industry and what it entails from the outset. These Units set the scene for the more specialist Units in food manufacturing.

♦ It is likely also that candidates who wish to take the optional Unit '*Science for the Food Industry: An Introduction'* will have the opportunity to do so at the start of the award. This will allow the Units which provide essential underpinning scientific knowledge and understanding — *Microbiology of Foods 1* and *Food Composition* — to be delivered soon after the two general Units and before the specialist food manufacturing Units. This approach will allow other mandatory Units in science subjects such as *Food Analysis* to be programmed towards the end of the first year of the award.

♦ Graded Unit 1, as already indicated, will take place towards the end of the first year of the course. This Graded Unit is based on the mandatory Units in the HNC framework and, by this time, candidates are likely to have completed all these Units. They should give candidates a number of ideas for suitable projects, although they will need advice and guidance from tutors on which project to choose.

Year 2

♦ *Food Manufacturing: Post Manufacturing Processes* in the Food Chain naturally follows from the Food Manufacturing Units taken in Year 1 and completes the suite of mandatory Food Manufacturing Units.

♦ *Sensory Assessment of Foods* provides part of the underpinning knowledge for Food Product Development Principles and the Graded Unit 2, so is ideally delivered early in Year 2. The Unit Statistics for Science 1 supports the quantitative aspects of sensory tests and it is beneficial for it to be delivered alongside.

♦ The Units *Microbiology of Foods: Quality and Safety and Food Composition: Raw Materials* allow enhancement of the knowledge and practical skills developed in the Food Science Units in Year 1. These Units are valuable background for the four optional sectoral Units, eg *Food Manufacture: Technology of Meat and Fish Products*; *Food Manufacture: Technology of Milk* and *Dairy Products; Food Manufacture: Bakery Technology*; and *Food Manufacture; Beverages Technology*.

♦ The Units Food Quality *Management; Food Analysis and Nutritional Labelling*; and *Food Product Development Principles* complete the mandatory component of the structure and preparation for the Graded Unit 2. It is recognised at this juncture that incorporating optional Units in, for example, marketing, supervision and business management will broaden employment opportunities.

♦ Graded Unit 2, as already indicated, will take place towards the end of the second year of the course. This Graded Unit is based on the mandatory Units in the HND framework and, by this time, candidates are likely to have completed all these Units. They should also give candidates a number of ideas for suitable product development projects, although they will need advice and guidance from tutors on which project to choose.

This sequence of delivery over two years should also permit the development of Core Skills, particularly during year 1 but with further development in year 2. There are, as Appendix 4 shows, a number of opportunities for candidates to gather evidence for Core Skills throughout the award. The Graded Units are particularly important in this respect because of the number of opportunities that they offer for Core Skills. The Graded Units can provide an opportunity for candidates to extend the Core Skills evidence they can gather for Core Skills and to consolidate evidence that they have gathered from other Units.

Appendix 3 illustrates a possible delivery sequence for the HND Food Science and Technology and also includes some explanation to indicate why this sequence is appropriate. It would, however, be possible to structure the delivery on the Units in other ways if desired.

The minimum requirement for an SQA HND award is 30 credits and HND candidates normally follow a programme of 15 SQA credits during the first year (full time). The structure of the proposed HNC Food Science and Technology would permit a candidate who wished to do so to exit at the end of Year 1 with an HNC Food Science and Technology. Indeed, candidates intending to progress to the HND Food Science and Technology will also have achieved the 12 credits for the HNC Food Science and Technology plus 3 further credits which will count towards their HND Food Science and Technology.

6.2   Approaches to Assessment

The Units within the HND Food Science and Technology permit a range of different assessment methods. The actual assessment instruments used are developed by the delivering centre, but Appendix 5 shows an Assessment Planner which summarises the methods recommended in the Unit specifications and confirms that a range of different assessment instruments are likely to be used. In line with the practical emphasis of many of the Units in the framework, the assessments are predominantly practically-based. Practical assessments make use of observation checklists to ensure that candidates exhibit safe, clean and hygienic food practices. In the food manufacturing Units, for example, candidates are required to record and present the results of their practical work using tables and graphs (where appropriate) and to include all necessary calculations and referencing. Candidates are also expected to draw some conclusions from the practical work — in particular about its applicability to larger scale industrial situations. In this way, the assessment reinforces delivery by linking the award as closely as possible to the food and drink industry.

The Assessment Planner shows that the assessment for one of the mandatory Units, *F4TL34: Food Hygiene Intermediate*, is an examination. This is to meet the requirements of REHIS and to enable candidates to gain the professional recognition of the REHIS Intermediate Food Hygiene Certificate.

In addition, the assessment planner shows that assessment between different Units is connected. The pattern of assessment in the food manufacturing Units in year 1, for example, is common across all three Units and links closely to that for the introductory food industry Units.

This should help to ensure that the assessment is manageable for candidates. The QDT were concerned when overseeing the development of the new Units that the amount of assessment would not become a burden for candidates. This is a further advantage of practically-based assessment as it helps to ensure that assessment arises naturally out of the learning and teaching process.

6.3   Open Learning

In principle, it is possible for the HND Food Science and Technology to be delivered by Open Learning. However, the amount of practical work in many of the Units in the award means that it may not be straightforward to make suitable arrangements for open learning candidates. It would be necessary, for example, to ensure that candidates have the opportunity to undertake practical work. This could also be complex because of the importance of the stringent safety, health and hygiene requirements for the food and drink industry. It would be necessary also to make appropriate arrangements for assessment particularly since much of the practical work requires observation checklists.

Authentication is not an issue that relates solely to open or distance learning. However, the fewer the opportunities for assessors and candidates to meet face-to-face, the greater the need becomes to build in authentication strategies.

SQA approved centres are responsible for the authentication of their open, distance or mixed mode programmes through their quality assurance processes. Centres must be confident that:

♦   candidates entered for a qualification are who they say they are
♦   evidence submitted for assessment by candidates can be authenticated as their own work

SQA recommend that a mix of authentication tools be used to ensure the above, eg:

♦   Questioning — personal, telephone or online interview
♦   Written questioning
♦   ICT — on-line conferences, email discussions, password controlled systems, handwriting recognition, computer scanning of facial features, voice prints, finger prints, hand patterns and recognition of key board use.
♦   Personal logs and personal statements
♦   Witness testimony
♦   Summative assessment under supervision
♦   Audio-taped or video taped evidence
♦   Signing and counter-signing of candidates work
♦   Assessment supervisors — authenticators, invigilators and mentors

Further advice and guidance on open learning is available at SQA's website, **www.sqa.org.uk**

6.3 Additional Support Needs

Where appropriate and necessary, delivery and assessment learning will be structured to allow for candidates with additional support needs. Any such arrangements will take into account the advice and guidance on SQA's website at **www.sqa.org.uk/assessmentarrangments**

6.4 Transitional Arrangements

The HND in Food Science and Technology award is a national award which replaces an existing locally-devised award which has been discontinued. It is not necessary, therefore, to make transition arrangements for candidates to move from the previous award to the HND Food Science and Technology (G9PX 16). However, there may be a need to make arrangements for credit transfer for candidates who have achieved some Units in the previous HND Food Technology but have not completed the full award. Such arrangements would allow candidates to gain credit in the HND Food Science and Technology for previous achievement.

The number of candidates to whom this might apply is likely to be very small. It is intended, therefore, that any arrangements for credit transfer will be made on a case by case basis.

7 General information for centres

Disabled candidates and/or those with additional support needs

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

Internal and external verification

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

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

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

8   General information for candidates

Welcome to the HND Food Science and Technology. If you are undertaking this award as a full time candidate, it covers two academic years and is designed to give you the skills, knowledge and understanding you will need to gain employment in the food and drink industry.

Food and drink is the largest manufacturing sector in Scotland and in the UK as a whole. It is diverse and includes a wide range of different activities such as bakery, meat and fish processing, drinks and dairy produce. It is a dynamic industry which has to respond to consumer demands that can change on a daily basis. It also has to be able to meet the requirements of food retailers (such as supermarkets) to make quality products and deliver them within agreed time scales which may be very short. The food and drink industry also has a history of being ready to adapt to new technology to meet customer expectations.

In addition, food and drink is a significant industry in other ways too. It has a very high profile because health, diet and nutrition are all important in today's society and are directly linked to the consumption and production of food and drink. As someone working in the food and drink industry, you will have to take factors like these into account in your work. Safety is of paramount importance in the industry too. Food and drink products have to be produced in a hygienic environment to ensure that they are safe for consumers.

The food and drink industry is closely connected with farming as many of its materials come from farmers. It has a key role to play in environmental protection and sustainability. Food and drink is a global industry too. Commodities used by the industry come from all over the world and UK exports of food and drink products are worth about £10 billion a year.

Jobs in the food and drink industry are fast moving and offer a lot of variety. As someone working in the food industry, you will be involved in providing the kind of food products that people want — and to meeting changing consumer tastes and requirements. There are a wide range of employment opportunities for qualified people. The HND in Food Science and Technology will provide opportunities to help you to work in any part of the industry that you choose. For example, you could work in a technical role supporting product development, production operations, quality assurance, plant hygiene or the raw materials and packaging supply chain.

The award will also give you the background that you will need for a career in food hygiene or food inspection.

The HND Food Science and Technology has a number of specific aims. It will enable you to:

♦   prepare for employment in a technical, scientific or future managerial position in the food industry or in the regulatory sector
♦   develop skills, knowledge and understanding of new product development in the food industry

- develop practical skills in the technology of food processing techniques and relate these to the post manufacturing supply chain in and to food quality management in the modern food industry
- develop a knowledge and understanding of the principles of food safety sufficient to gain the REHIS Intermediate Food Hygiene Certificate
- develop knowledge and understanding of food science and apply it to key aspects of the food industry such as sensory assessment of foods and food analysis
- gain the underpinning scientific knowledge and understanding you will need to function effectively in the modern food industry and apply this to food composition and food quality and safety
- have the opportunity to apply your general skills, knowledge and understanding of food processing to the technology of specific sectors of the food industry
- develop practical laboratory skills required in the modern food industry
- select optional units which will allow you to develop skills, knowledge and understanding in areas which are of particular interest or relevance to them

The HND Food Science and Technology will introduce you to the food industry and to the factors which influence it and what it does. This is often described by the phrase 'farm to fork'. Farmers provide the materials which the food and drink industry uses to make food and drink products. These products are then supplied to retailers where consumers buy them.

Food can be processed in many different ways so this HND includes a range of methods of food processing and technology. It also enables you to look at the development of new food products and important issues like quality assurance in food manufacturing. Science is also important in the food and drink industry. Food is made up of chemical compounds and is affected by biological factors such as micro-organisms. In order to fully understand food processing you will therefore study food science including food composition and microbiology. This will help you to understand what happens to food products when they are being made. Microbiology for example is very significant in food quality assurance and safety. The HND, though, is predominantly a practical and applied course. Your work will include practical work in both food processing and in the laboratory.

To be awarded the HND Food Science and Technology, you have to achieve 30 credits in total (ie 240 SCQF credit points) — which include 21 mandatory credits (ie 168 SCQF credit points) and any nine of the optional credits (ie 72 SCQF credit points).

The award is divided into a number of Units each of which covers a different aspect of food science or technology. Some of these Units are mandatory and these are ones which you must take. There is a range of other Units too, such as ICT, Supervision and Management, which will give you the chance to develop other skills etc.

There are assessments associated with each Unit which will be fully explained to you. Many of these assessments are based on practical work and you will undertake them as part of your normal study activities. To succeed in a Unit you must complete the assessment for the Unit to the required standard.

As part of this award, you will also do what is known as a Graded Unit. There are two of these and you will take Graded Unit 1 at the end of the first year and Graded Unit 2 towards the end of the course. Both are project assignments which will help you bring together the different aspects of food science and technology that you have been studying throughout each year of the award.

One of the Units in year 1 is Food Hygiene Intermediate. This Unit is the equivalent of the Intermediate Certificate of the Royal Environment Health Institute of Scotland (REHIS) and is the only Unit in the HND which is assessed by a formal exam. Passing this Unit will give you recognition by an important professional body connected to the food industry. This means that the HND in Food Science and Technology offers you the first step towards professional work within the food industry in food hygiene and inspection if this is something you wish to do in your career.

After you have completed the HND Food Science and Technology you will be in a position to seek employment in the food and drink industry. There are many job opportunities in the food and drink industry for food scientists and technologists and you HND in Food Science and Technology can be the start of a rewarding career in a dynamic, fast moving industry which makes products that are vital to everyone.

In addition, achievement of this HND will allow you to qualify for student membership of the professional body Institute of Food Science and Technology (IFST), which means that you can become part of the professional community of food scientists and can benefit from the development opportunities that this can bring.

Good luck with your studies!

9 Glossary of terms

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

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

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

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

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

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: HNC Food Science and Technology (G9DD 15)
Appendix 2: Mapping of NOS to HND Units using Improve Units
Appendix 3: Possible delivery sequence
Appendix 4: Opportunities to develop Core Skills
Appendix 5: Assessment Grid — Mandatory Units

Appendix 1: Framework of HNC Food Science and Technology (G9DD 15)

Unit code	Unit title	SQA credit value	SCQF level
Mandatory Units (9 SQA credits)			
F6VF 34	Food Industry Principles: An Introduction	1	7
F6VE 34	Food Industry Practices: An Introduction	1	7
F6VG 34	Food Manufacturing: Processing Practices at Ambient Temperatures	1	7
F6VJ 34	Food Manufacturing: Processing Practices at Sub-Ambient Temperatures	1	7
F6VH 34	Food Manufacturing: Processing Practices at Elevated Temperatures	1	7
F6VL 34	Microbiology of Foods 1	1	7
F6VD 34	Food Composition	1	7
F4TL 34	Food Hygiene Intermediate	1	7
F7EW 34	Graded Unit 1	1	7
	Total Mandatory Units	**9**	
Optional Units (any 3 SQA credits)			
F6VB 33	Science for the Food Industry: An Introduction	1	6
F6VC 34	Food Analysis	1	7
F6VM 34	Microbiology of Foods 2	1	7
F6VK 34	Legislation and the Food Industry	1	7
DV9T 34	Fundamentals of Quality	1	7
J1BV 34*	Business Management: an Introduction	1	7
D85F 34	Using Software Applications Packages	1	7
	Total Optional Units	**3**	
	Total SQA Credits for HNC	**12**	

The HNC Food Science and Technology (G9PP 15) will be awarded to candidates who achieve the nine mandatory Units (72 SCQF credit points) and who achieve any three Units from the list of optional Units (24 SCQF credit points).

Successful candidates will gain a total of 96 SCQF credit points from the HNC Food Science and Technology. All 72 SCQF points from the mandatory Units will be at SCQF level 7. The remaining 24 SCQF points from the optional Units will be at SCQF level 7 or will be a combination of SCQF level 6 and SCQF level 7, depending on the options selected.

Appendix 2:   Mapping of HND Units to Improve Units

Mapping of National Occupational Standards (NOS) to HNC/D Food Science and Technology Units Using Improve Units

Table 1

Unit code	Unit title	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
	Mandatory Units																				
F6VF 34	Food Industry Principles: An Introduction		✓						✓			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
F6VE 34	Food Industry Practices: An Introduction		✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			✓		✓	✓
F6VG 34	Food Manufacturing: Processing Practices at Ambient Temperatures		✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓
F6VJ 34	Food Manufacturing: Processing Practices at Sub-Ambient Temperatures		✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			✓	✓	✓	✓
F6VH 34	Food Manufacturing: Processing Practices at Elevated Temperatures		✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			✓	✓	✓	✓
F4TL 34	Food Hygiene Intermediate		✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓				✓	✓	✓
F6VD 34	Food Composition	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓						
F6VL 34	Microbiology of Foods 1		✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓					✓	
F6VM 34	Microbiology of Foods 2		✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓					✓	
F6VK 34	Legislation and the Food Industry		✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓					✓	✓
F7EW 34	Graded Unit 1	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓		✓	✓	✓
F8L6 35	Food Manufacturing: Post Manufacturing Processes within the Food Chain		✓	✓	✓		✓	✓	✓	✓		✓	✓	✓	✓			✓	✓	✓	✓
F8L8 35	Food Quality Management		✓	✓	✓		✓	✓	✓	✓		✓	✓	✓	✓				✓	✓	✓

Table 1 (cont)

Code	Unit title	National Occupational Standard (NOS)																			
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
F8L7 35	Food Product Development Principles	✓	✓			✓		✓	✓	✓	✓		✓		✓						
F8L3 35	Sensory Assessment of Foods	✓	✓	✓		✓		✓	✓	✓		✓	✓	✓	✓		✓				
F8L9 35	Microbiology of Foods: Food Quality and Safety	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
F8L5 35	Food Composition: Raw Materials	✓	✓		✓	✓	✓	✓	✓	✓	✓		✓	✓	✓			✓	✓	✓	✓
F8L4 35	Food Analysis and Nutritional Labelling	✓				✓		✓	✓	✓	✓		✓	✓	✓						
F8XG 35	Graded Unit 2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Optional Units																				
F6VB 34	Introduction to Science for the Food Industry	✓				✓					✓										
DV9T 34	Fundamentals of Quality													✓	✓						
F1RJ 34	Business Management: An Introduction																				
D85F 34	Using Software Applications Packages			✓																	
F8M9 35	Food Manufacturing: Technology of Meat and Fish Products		✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓
F8M6 35	Food Manufacturing: Technology of Milk and Dairy Products		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
F8M7 35	Food Manufacturing: Bakery Technology		✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓
F8M8 35	Food Manufacturing: Beverages Technology		✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

Table 1 (cont)

Code	Unit title	National Occupational Standard (NOS)																			
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
F2EE 34	Pollution and Waste Management: An Introduction		✓										✓						✓		
F3X3 35	Data Collection and Handling			✓											✓				✓		
DN8C 34	Statistics for Science 1			✓											✓				✓		
DV08 35	Statistics for Science 2			✓											✓				✓		
F7BX 34	Marketing: An Introduction													✓	✓						
F5CP 34	Supervision and Management				✓								✓						✓	✓	✓
DE1K 33	Workplace Communication in English																		✓		

Mapping of National Occupational Standards to HND Units Using Improve Units

Table 2
This covers Improve Units which apply to Units within the HND part of the framework

Unit code	Unit title	National Occupational Standard (NOS)										
		21	22	23	24	25	26	27	28	29	30	31
Mandatory Units												
F8L6 35	Food Manufacturing: Post Manufacturing Processes in the Food Chain		✓				✓	✓				✓
F8L8 35	Food Quality Management	✓		✓				✓			✓	
F8L7 35	Food Product Development Principles	✓	✓		✓	✓				✓	✓	
F8L3 35	Sensory Assessment of Foods	✓			✓	✓		✓		✓		
F8L9 35	Microbiology of Foods: Food Quality and Safety	✓						✓			✓	
F8L5 35	Food Composition: Raw Materials				✓				✓			
F8L4 35	Food Analysis and Nutritional Labelling	✓	✓	✓	✓		✓	✓			✓	
F8XG 35	Graded Unit 2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Optional Units												
F8M9 35	Food Manufacture: Technology of Meat and Fish Products		✓	✓	✓	✓	✓		✓	✓	✓	
F8M6 35	Food Manufacture: Technology of Milk and Dairy Products		✓	✓	✓	✓	✓		✓	✓	✓	
F8M7 35	Food Manufacture: Bakery Technology		✓	✓	✓	✓	✓		✓	✓	✓	
F8M8 35	Food Manufacture: Beverages Technology		✓	✓	✓	✓	✓		✓	✓	✓	
F2EE 34	Pollution and Waste Management: An Introduction			✓		✓		✓				
F3X3 35	Data Collection and Handling	✓		✓				✓			✓	
DN8C 34	Statistics for Science 1	✓		✓				✓			✓	
DV08 35	Statistics for Science 2	✓		✓				✓			✓	
F7BX 34	Marketing: An Introduction									✓		✓
F5CP 34	Supervision and Management							✓				
DE1K 33	Workplace Communication in English							✓				

NB – For Key to Improve Units in these Mapping Grids, please see following pages

Key to Improve Units in the Mapping grid

Number in table	Improve Unit title
1	Food science in manufacture
2	HACCP for food manufacturing
3	ICT and MIS in food manufacture
4	Principles and practices of food safety management in manufacture
5	Principles of biological science essential in food manufacture (L2)
6	Principles of Clean In Place (CIP) and disinfection (L2)
7	Principles of effective food manufacture
8	Principles of food and raw materials in manufacture
9	Principles of food processing practice (L2)
10	Principles of food science in manufacture (L2)
11	Principles of handling in manufacture (L2)
12	Principles of monitoring and assessing risks in food manufacture
13	Principles of product quality and improvements in food manufacture (L2)
14	Principles of quality in food manufacture
15	Principles of sharpening, maintain and selecting cutting tools and equipment in food manufacture (L2)
16	Principles of the food and drink manufacturing sector (L2)
17	Principles of the use and storage of materials in food manufacture L2)
18	Principles of working effectively in food manufacture (L2)
19	Principles of working safely in food manufacture (L2)
20	Principles of workplace food safety in manufacture (L2)
21	Food technology calculations in manufacture
22	Pack and label products in manufacture
23	Principles of food testing analysis and measurement in manufacture
24	Principles of human nutrition for food manufacture
25	Principles of improvement in food manufacture
26	Principles of wrapping food products for customers
27	Principles of monitoring and assessing risks in food manufacture
28	Principles of performance and people in food manufacture
29	Principles of product development in food manufacture
30	Principles of quality sampling and testing in food manufacture
31	Principles of retail operations in food manufacture

Appendix 3: Possible Delivery Sequence

HND in Food Science and Technology: Year 1: Possible Delivery Sequence

Year 1 of the HND enables candidates to meet the requirements of the HNC. The following amounts, therefore, to a delivery sequence for the HNC. Based on a teaching year divided into 3 blocks, year 1 could be delivered in the following sequence:

Block 1
Food Industry Principles: An Introduction
Food Industry Practices: An Introduction
Science for the Food Industry: An Introduction
Food Hygiene Intermediate
Legislation and the Food Industry

Block 2
Food Manufacturing: Processing Practices at Sub-ambient Temperatures
Food Manufacturing: processing Practices at Ambient Temperature
Microbiology of Foods 1
Food Composition
Using Software Application Packages

Block 3
Food Manufacturing: Processing Practices at Elevated Temperatures
Food Analysis
Microbiology of Foods 2
Fundamentals of Quality
Graded Unit 1

The above sequence meets the following criteria:

♦ Block 1 concentrates on ensuring that candidates build the foundation that they will need for the award. It includes all introductory Units on the food and drink industry and other key Units which enable candidates to become aware of key contextual factors which affect the food and drink industry.
♦ Block 2 develops the subjects introduced in Block 1 through the specialist food science and technology Units. Using Software Applications Packages is included in Block 2 to ensure that candidates develop these critical transferable skills as an integral part of their programme of study and will be able to apply them to their work in Block 3, especially the Graded Unit.
♦ Block 3 completes the specialist food technology Units and allows candidates to take forward their study of food science. The nature of the Graded Unit means that it must come towards the end of the delivery sequence.
♦ The delivery sequence spreads optional Units throughout the academic year (there is one in each Block) and enables candidates to complete 15 credits. Those who wish to do so should, therefore, be in a position to progress to an HND Food Science and Technology.

HND in Food Science and Technology: Year 2: Possible Delivery Sequence

Candidates would complete the HND after two years of study. Based on a teaching year divided into three blocks, Year 2 could be delivered in the following sequence:

Block 1
Sensory Assessment of Foods
Statistics for Science 1
Food Composition: Raw Materials
Food Manufacturing: Post Manufacturing Processes in the Food Chain
Microbiology of Foods: Food Quality and Safety

Block 2
Food Product Development Principles
Food Manufacture: Technology of Meat and Fish Products
Food Manufacture: Bakery Technology
Food Quality Management
Food Analysis and Nutritional Labelling

Block 3
Food Manufacture: Technology of Milk and Dairy Products
Food Manufacture: Beverages Technology
Marketing: An Introduction
Graded Unit 2

♦   Block 1 concentrates on completing the suite of Food Manufacturing Units which were commenced in Year 1 and completes the suite of mandatory Food Manufacturing Units. Whilst Sensory Assessment of Foods provides part of the underpinning knowledge for Food Product Development Principles. In addition, Statistics for Science 1 supports the quantitative aspects of sensory tests.

♦   In Block 2, the Units Microbiology of Foods: Quality and Safety and Food Composition: Raw Materials allow enhancement of the knowledge and practical skills developed in the Food Science Units in Year 1. These Units are also valuable background for the four sectoral Units which could be delivered across Blocks 2 and 3.

♦   Also in Block 2, the suggested delivery schedule completes the mandatory component of the award (apart from Graded Unit 2)

♦   In Block 3, it is suggested that candidates complete the remaining two sectoral Units, as well as the optional Unit (eg Marketing: An Introduction) which can assist in broadening employment opportunities.

♦   Graded Unit 2, as already indicated, will take place towards the end of the second year of the course. This Graded Unit is based on the mandatory Units in the HND framework as, by this time, candidates are likely to have completed all required Units. They should also give candidates a number of ideas for suitable product development projects, although they will need advice and guidance from tutors on which project to choose.

♦   This delivery sequence spreads optional Units throughout Year 2 and enables candidates to complete the 15 credits required (together with 15 credits in Year 1) to achieve HND Food Science and Technology.

Appendix 4: Opportunities to develop Core Skills

This Appendix gives the Core Skills profile for the HND Food Science and Technology.

It maps the mandatory and optional Units against the 5 Core Skills — Communication; Information Communication Technology (ITC); Numeracy; Problem Solving; and Working with Others. The mapping shows that the HND provides opportunities for candidates to gather evidence for some components of all the Core Skills. Given that the highest Core Skills level is SCQF level 6, HND programmes provide fewer opportunities for candidates to achieve progression in Core Skills. Candidates who have completed an HNC Food Science and Technology will have achieved some Core Skills progression and the HND Food Science and Technology offers considerable scope for candidates to consolidate their Core Skills development.

There are two optional Units with embedded Core Skills ie:
♦ D85F 34 Using Software Applications Packages includes certification of ITC at SCQF level 5
♦ DE1K 33 Workplace Communication in English includes certification of Communication Core Skill at SCQF level 5.

These embedded Core Skills add value and enhance the Core Skills profile of the HNC and HND by allowing the Core Skills of ICT and Communication to be included.

The mapping also illustrates the key role played by the two Graded Units. Neither Graded Unit contains embedded Core Skills but both provide opportunities for candidates to gather evidence for a number of Core Skills components, particularly problem solving and working with others.

The Core Skills profile reflects the aims of the HND Food Science and Technology. The award seeks to prepare candidates for entry into the food and drink industry. It builds on the HNC Food Science and Technology by focusing on the application of fundamental skills, knowledge and understanding acquired during the HNC. The focus of the HND is, therefore, on key operational matters of relevance to the food and drink industry such as new product development and quality management. By including Units which concentrate on operational and related managerial issues, the HND Food Science and Technology builds on the platform of the HNC and is oriented much towards the Core Skill of problem solving which is vital for successful operations in the industry. The HND also emphasises working with others to a greater extent than is the case in the HNC.

Core Skills mapping of HND Food Science and Technology — Mandatory Units

S = signposted; E = embedded [at SCQF level shown]

		Communication			Numeracy		ICT	Problem Solving				Working with Others	
Unit code	Unit title	Oral	Reading	Writing	Using Graph Information	Using Number	Accessing information	Providing/creating information	Critical thinking	Planning and organising	Reviewing and evaluating	Working co-operatively with others	Reviewing co-operative contribution
F6VF 34	Food Industry Principles: An Introduction			SCQF level 5 S									
F6VE 34	Food Industry Practices: An Introduction			SCQF level 5 S								SCQF level 5 S	
F6VG 34	Food Manufacturing : Processing Practices at Ambient Temperatures			SCQF level 5 S								SCQF level 5 S	

Unit code	Unit title	Communication			Numeracy		ICT	Problem Solving				Working with Others	
		Oral	Reading	Writing	Using Graph Information	Using Number	Accessing information	Providing/creating information	Critical thinking	Planning and organising	Reviewing and evaluating	Working co-operatively with others	Reviewing co-operative contribution
F6VJ 34	Food Manufacturing : Processing Practices at Sub-Ambient Temperatures			SCQF level 5 S		SCQF level 5 S						SCQF level 5 S	
F6VH 34	Food Manufacturing : Processing Practices at Elevated Temperatures			SCQF level 5 S		SCQF level 5 S						SCQF level 5 S	
F8L6 35	Food Manufacturing : Post Manufacturing Processes within the Food Chain			SCQF level 6 S		SCQF level 6 S			SCQF level 6 S		SCQF level 6 S		

Unit code	Unit title	Communication			Numeracy		ICT	Problem Solving				Working with Others	
		Oral	Reading	Writing	Using Graph Information	Using Number	Accessing information	Providing/creating information	Critical thinking	Planning and organising	Reviewing and evaluating	Working co-operatively with others	Reviewing co-operative contribution
F8L8 35	Food Quality Management			SCQF level 6 S					SCQF level 6 S		SCQF level 6 S		
F8L7 35	Food Product Development Principles			SCQF level 6 S					SCQF level 6 S		SCQF level 6 S	SCQF level 6 S	
F8L3 35	Sensory Assessment of Foods			SCQF level 6 S		SCQF level 6 S			SCQF level 6 S	SCQF level 6 S	SCQF level 6 S	SCQF level 6 S	
F6VL 34	Microbiology of Foods 1			SCQF level 5 S									
F6VL 34	Microbiology of Foods 2			SCQF level 5 S		SCQF level 5 S							

Unit code	Unit title	Communication			Numeracy		ICT	Problem Solving				Working with Others	
		Oral	Reading	Writing	Using Graph Information	Using Number	Accessing information	Providing/creating information	Critical thinking	Planning and organising	Reviewing and evaluating	Working co-operatively with others	Reviewing co-operative contribution
F8L9 35	Microbiology of Foods: Food Quality and Safety			SCQF level 6 S		SCQF level 6 S			SCQF level 6 S		SCQF level 6 S		
F6VD 34	Food Composition			SCQF level 5 S									
F8L5 35	Food Composition: Raw Materials			SCQF level 6 S									
F6VC 34	Food Analysis			SCQF level 5 S		SCQF level 5 S							
F8L4 35	Food Analysis and Nutritional Labelling			SCQF level 6 S		SCQF level 6 S			SCQF level 6 S		SCQF level 6 S		
F6VK 34	Legislation and the Food Industry			SCQF level 6 S	SCQF level 5 S					SCQF level 5 S			SCQF level 5 S

Unit code	Unit title	Communication			Numeracy		ICT	Problem Solving				Working with Others	
		Oral	Reading	Writing	Using Graph Information	Using Number	Accessing information	Providing/creating information	Critical thinking	Planning and organising	Reviewing and evaluating	Working co-operatively with others	Reviewing co-operative contribution
F4TL 34	Food Hygiene Intermediate	No specific signposted or embedded Core Skills											
F7EW 34	Graded Unit 1	SCQF level 5 S	SCQF level 5 S	SCQF level 6 S	SCQF level 4 S	SCQF level 5 S	SCQF level 5 S	SCQF level5 S	SCQF level 6 S	SCQF level 6 S	SCQF level 6 S		
F8XG 35	Graded Unit 2	SCQF level 6 S	SCQF level 6 S	SCQF level 6 S	SCQF level 6 S	SCQF level 6 S	SCQF level 6 S	SCQF 6 S	SCQF level 6 S	SCQF level 6 S	SCQF level 6 S	SCQF level 6 S	SCQF level 6 S

Core Skills mapping of HND Food Science and Technology — Optional Units

S = signposted; E = embedded [at SCQF level shown]

Unit code	Unit title	Communication			Numeracy		ICT	Problem Solving					Working with Others	
		Oral	Reading	Writing	Using Graph Information	Using Number	Accessing information	Providing/creating information	Critical thinking	Planning and organising	Reviewing and evaluating		Working co-operatively with others	Reviewing co-operative contribution
F6VB 34	Science for the Food Industry: An Introduction			SCQF level 4 S										
DV9T 34	Fundamentals of Quality		SCQF level 6 S	SCQF level 6 S										
FIRJ 34	Business Management: An Introduction	SCQF level 6 S	SCQF level 6 S	SCQF level 6 S		SCQF level 5 S				SCQF level 5 S				
D85F 34	Using Software Applications Packages						SCQF level 5 E	SCQF level 5 E						

Unit code	Unit title	Communication			Numeracy		ICT	Problem Solving				Working with Others	
		Oral	Reading	Writing	Using Graph Information	Using Number	Accessing information	Providing/creating information	Critical thinking	Planning and organising	Reviewing and evaluating	Working co-operatively with others	Reviewing co-operative contribution
F8M9 35	Food Manufacture: Technology of Meat and Fish Products			SCQF level 6 S					SCQF level 6 S		SCQF level 6 S		
F8M6 35	Food Manufacture: Technology of Milk and Dairy Products			SCQF level 6 S					SCQF level 6 S		SCQF level 6 S		
F8M7 35	Food Manufacture: Bakery Technology			SCQF level 6 S					SCQF level 6 S		SCQF level 6 S		
F8M8 35	Food Manufacture: Beverages Technology			SCQF level 6 S					SCQF level 6 S		SCQF level 6 S		

Unit code	Unit title	Communication			Numeracy		ICT	Problem Solving				Working with Others	
		Oral	Reading	Writing	Using Graph Information	Using Number	Accessing information	Providing/creating information	Critical thinking	Planning and organising	Reviewing and evaluating	Working co-operatively with others	Reviewing co-operative contribution
F2EE 34	Pollution and Waste Management: An Introduction			SCQF level 6 S					SCQF level 6 S		SCQF level 6 S	SCQF level 6 S	
F3X3 35	Data Collection and Handling				SCQF level 6 S	SCQF level 6 S			SCQF level 6 S	SCQF level 6 S	SCQF level 6 S		
DN8C 34	Statistics for Science 1				SCQF level 6 S	SCQF level 6 S							
DV08 35	Statistics for Science 2				SCQF level 6 S	SCQF level 6 S							

Unit code	Unit title	Communication			Numeracy		ICT	Problem Solving				Working with Others	
		Oral	Reading	Writing	Using Graph Information	Using Number	Accessing information	Providing/creating information	Critical thinking	Planning and organising	Reviewing and evaluating	Working co-operatively with others	Reviewing co-operative contribution
F7BX 34	Marketing: An Introduction	SCQF level 6 S	SCQF level 6 S	SCQF level 6 S					SCQF level 6 S	SCQF level 6 S	SCQF level 6 S		
F5CP 34	Supervision and Management	SCQF level 6 S	SCQF level 6 S	SCQF level 6 S					SCQF level 6 S	SCQF level 6 S	SCQF level 6 S	SCQF level 6 S	SCQF level 6 S
DE1K 33	Workplace Communication in English	SCQF level 5 E	SCQF level 5 E	SCQF level 5 E									

Appendix 5: Assessment Grid — Mandatory Units

The Units in the HND Food Science and Technology permit a range of different assessment methods. The actual assessment instruments will be developed by the delivering centre, however the grid below summarises the methods recommended in the Unit specifications and confirms that a range of different assessment instruments are likely to be used.

In line with the practical emphasis of many of the Units in the framework, the assessments are also predominantly **practically-based** as these make use of observation checklists to ensure that candidates exhibit safe, clean and hygienic food practices. In some Units, candidates are required to record and present the results of their practical work using tables; graphs (where appropriate); referencing (where appropriate) and to include all necessary calculations.

Candidates are also expected to draw some conclusions from the practical work — in particular about its applicability to larger scale industrial situations. In this way, the assessment reinforces delivery by linking the award closely to the food and drink industry. As you will see in the grid, the assessment for the mandatory Unit *F4TL34: Food Hygiene Intermediate* is an examination. This is to meet the requirements of REHIS and to enable candidates to gain the professional recognition of the REHIS Intermediate Food Hygiene Certificate.

It is also important to note that assessment between different Units is connected, eg the pattern of assessment in the food manufacturing Units is common across all three Units and links closely to that for the introductory food industry Units — which will help to ensure that the assessment is manageable for candidates. The volume of assessment was considered carefully when developing the Units to ensure that assessments would not become a burden for candidates. This is a further advantage of practically-based assessment as it helps to ensure that assessment arises naturally out of the learning and teaching process.

Unit code	Unit title	Type of Assessment	Comments
F6VF 34	Food Industry Principles: An Introduction	Open-book	Based on questions to elicit knowledge and understanding
F6VE 34	Food Industry Practices: An Introduction	Open-book and practical	Practical work supplemented by observation checklists and reports
F6VG 34	Food Manufacturing: Processing Practices at Ambient Temperatures	Open-book and practical	Practical work supplemented by observation checklists and reports
F6VJ 34	Food Manufacturing: Processing Practices at Sub-Ambient Temperatures	Open-book and practical	Practical work supplemented by observation checklists and reports
F6VH 34	Food Manufacturing: Processing Practices at Elevated Temperatures	Open-book and practical	Practical work supplemented by observation checklists and reports
F6VL 34	Microbiology of Foods 1	Open-book and practical	Practical laboratory work supplemented by observation checklists and reports
F6VM 34	Microbiology of Food 2	Open-book and practical	Practical laboratory work and analysis supplemented by observation checklists and reports
F6VD 34	Food Composition	Open-book	Based on questions to elicit knowledge and understanding
F4TL 34	Food Hygiene Intermediate	Closed-book Examination	To conform with REHIS requirements
F6VK 34	Legislation and the Food Industry	Open-book	Report(s) with relevant referencing
F6VC 34	Food Analysis	Open-book and practical	Practical laboratory work and analysis supplemented by observation checklists and reports
F7EW 34	Graded Unit 1	Project	Chosen by candidates (with advice) to involve practical technical and laboratory work plus supporting evidence to demonstrate planning, developing and evaluating
F8L7 35	Food Product Development Principles	Open-book and practical	Feasibility Study supplemented by a report
F8L8 35	Food Quality Management	Open-book and practical	Case Study(ies) supplemented by report(s)

Unit code	Unit title	Type of assessment	Comments
F8L3 35	Sensory Assessment of Foods	Open-book and practical	Plan for and conduct sensory panel; analyse results — supplemented by report(s)
F8L9 35	Microbiology of Foods: Quality and Safety	Open-book and practical	Practical laboratory work supplemented by observation checklists and reports or responses to given questions
F8L5 35	Food Composition: Raw Materials	Open-book and practical	Research/investigation supplemented by reports or responses to given questions — to demonstrate application of knowledge and understanding
F8L4 35	Food Analysis and Nutritional Labelling	Open-book and practical	Practical laboratory work supplemented by observation checklists and reports or responses to given questions
F8L6 35	Food Manufacturing: Post Manufacturing Practices within the Food Chain	Open-book and practical	Practical testing and evaluating supplemented by observation checklists and reports or responses to given questions
F8XG 35	Graded Unit 2	Project	Chosen by candidates (with advice) to involve practical technical and laboratory work to propose, develop and test a new food product; plus supporting evidence to demonstrate planning, developing and evaluating.