Arrangements for:

HNC Aircraft Engineering

Group Award Code: G800 15

Validation date: August 2005

and

HND Aircraft Engineering

Group Award Code: G8GE 16

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Acknowledgement

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

History of changes

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

NOTE: Where a Unit is revised by another Unit:

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

Version number	Description	Date
05	Removal of finish date from unit DG4P 35 *Mathematics for Engineering 3.* Addition of Credit Transfer Table *see Page14.*	11/02/15
04	**Revision of Units**: D77G 34 *Communication: Practical Skills* revised by H7MB 34. DG4L 34 *Mathematics for Engineering 2* revised by H7K1 34 *Engineering Mathematics 2* on **HNC** and **HND** frameworks finishing 31/07/2016.	21/10/14
03	*Engineering Mathematics 3* (H7K2 34), *Engineering Mathematics 4* (H7K3 35) and *Engineering Mathematics 5* (H7K4 35) added as optional Units to HND framework.	21/08/14
02	HND Restricted optional Units — SCQF credit points changed from 72 to 48.	March 2009

Contents

1 Introduction 1
2 Rationale for the revision of the Group Award 1
2.1 Group Award title and level 1
2.2 Market research 1
2.3 Nature and purpose of the award 3
3 Aims of the Group Award 3
3.1 General aims of the HNC Group Award 3
3.2 Specific aims of the HNC Group Award 4
3.3 General aims of the HND Group Award 4
3.4 Specific aims of the HND Group Award 5
3.5 Target groups 6
3.6 Employment opportunities 6
3.7 Relationship to Sectorial Developments 6
4 Access to Group Award(s) 7
4.1 Access requirements 7
4.2 Recommended Core Skills Entry level 7
4.3 Alternative access arrangements 8
4.4 Candidates who have English as an additional language 8
5 Group Award structure 8
5.1 Framework for the HNC Group Award G800 15 8
5.2 Framework for the HND Group Award 10
5.3 Graded Units 12
5.4 Core Skills 12
5.4.1 Core Skills Exit profile 12
5.5. Mapping information 13
5.5.1 Aims of the Group Award 13
5.5.2 Core Skills development 13
5.5.3 National Occupational Standards 13
5.6 Articulation, professional recognition and credit transfer 14
5.6.1 Progression to Degree Studies 14
5.6.2 Recognition by Professional Bodies 14
5.6.3 Credit transfer arrangements 14
6 Approaches to delivery and assessment 15
6.1 Context and content 15
6.2 Delivery 16
6.2.1 Modes of delivery 16
6.2.2 Approaches to Learning and Teaching 18
6.3 Assessment 18
6.3.1 Assessment strategy 18
6.3.2 Graded Unit management 20
6.3.3 Assessment Exemplar materials 20
6.4 Resources 20
6.4.1 Practical resource requirements 20
6.4.2 Staff development 21
7 General information for centres 21
8 General information for candidates 22
9 Glossary of terms 24
10 Appendices 24

Appendix 1: Mapping of How the Aims of the Group Award are Met 25
Appendix 2: Core Skills development opportunities within HND Aircraft Engineering Units. 33
Appendix 3: HNC and HND Content Links to National Occupational Standards.....38
Appendix 4: Credit transfer opportunities from HNC Engineering: Aeronautical (G0E3 15) 41
Appendix 5: Suggested sequence of full-time delivery of Units to achieve the HNC and the HND Aircraft Engineering 43

1 Introduction

This is the Arrangements Document for the HNC Aircraft Engineering, validated in August 2006 and the HND Aircraft Engineering, which was validated in July, 2007**.** This document includes: background information on the development of the Group Awards, their aims, guidance on access, details of the HNC and the HND Group Award structure, and guidance on delivery.

The revised HND Group Award subsumes the HNC Aircraft Engineering (G0E3 15), Group Award and provides candidates with a course of direct relevance to the modern aircraft engineering business, consequently enhancing opportunities for career access and progression.

2 Rationale for the revision of the Group Award

2.1 Group Award title and level

This HNC Aircraft Engineering replaces the previous HNC Engineering: Aeronautical (G0E3 15) and the HND Aircraft Engineering replaces the previous HND Engineering: Aeronautical (G1S7 16) which were both developed under earlier design rules. It was noted by delivering centres and their industrial partners that these previous Group Awards no longer met the industry's needs.,

These revised Group Awards at HNC and HND level are specialist qualifications devised to meet the needs of the aircraft engineering business. As such, the title of the Group Awards, Aircraft Engineering, accurately and precisely reflects the nature of the qualifications while distinguishing them from the earlier qualifications, Engineering: Aeronautical.

2.2 Market research

The QDT for this revised HNC Group Award and for the revised HND Group Award comprised representatives of all the centres that were delivering the previous HNC/HND Engineering: Aeronautical Group Awards. The QDT decided the basis of consultative market research regarding many aspects of the revised HNC and HND awards.

The stakeholders consulted are listed below:

Stakeholder category	Specific contacts	Method of consultation
All	Future Skills Scotland SEMTA CAA	Documentary survey Questionnaire Letters of support
Further Education Centres	Ayr College James Watt College Perth College	Via QDT
Higher Education	UHI Strathclyde University	Interviews
Employers	BAMG Ryanair Loganair BAE Aerostructures Regional Aircraft	Questionnaire and Interviews
Professional Institutions	IIE SBAC	Letters of support
Candidates	Candidates past and present at current delivery centres	Via QDT

Meetings were held with some stakeholders to decide on the broad topics for consultation. The main form of consultation was a questionnaire which requested views on the following broad topics of the proposed HNC and HND revisions:

- The title of the Group Award
- The aims of the Group Award
- Titles and content of the new Units
- The award structure
- Progression routes
- Core Skills development strategy
- Strategy and rationale for the Graded Units

As a result of the consultation process, the HNC Aircraft Engineering provides a strong emphasis on core aircraft engineering principles and technology while the HND Aircraft Engineering provides more advanced principles and technology facilitating a higher level of specialisation. Both the HNC and the HND awards allow for the development of skills and knowledge for aircraft design, manufacturing and maintenance applications. The HNC is structured to allow three distinct specialist routes to the HND or to provide an integrated systems approach within the HND course program. These specialisations required by industry were identified as Airframes and Engines, Mechanical Systems and Avionics. This flexibility allows delivery centres the scope to devise their HND programme to build on to the HNC Aircraft Engineering in such a way to meet their specific customers' needs.

Generally, the HNC has been designed to provide a general pool of aircraft engineering specific Units with the HND expanding on the specialist areas as well as providing some broader Engineering, Information Communication Technology, Mathematics and Business Units to allow an extension of the learner's knowledge and skills and also to meet the needs of the aviation sector. Such broadening also promotes the development of skills transferable to careers in other industries. Embedded Core Skills are a design feature of both the HNC and the HND awards with some provision for separate certification.

Specifically, both the HNC, and to a greater extent, the HND in Aircraft Engineering have been designed to forge a closer alliance with the Civil Aviation Authority's required knowledge base and structure, thus making it directly relevant to the aircraft maintenance industry. Consultation with stakeholders outside the aircraft engineering maintenance industry also identified the need for an HNC and an HND with some design and manufacturing content related to the aircraft business.

All stakeholders identified the need for the HNC and the HND to provide progression to degree level as well as contributing to professional institute membership status.

2.3 Nature and purpose of the award

The qualification consultation process moulded the view of the QDT to design an HNC and an HND that took cognisance of the target group of candidates for the Group Awards while addressing progression routes to employment or degree studies, as well as working towards professional institution status. The Group Award structure also recognises developments at NQ level that will influence access to the HNC and the HND as well as Modern Apprenticeship and SVQ related developments, which are complemented by these Higher National awards.

3 Aims of the Group Award

The aims of the HNC and the HND Group Awards are specified below with Appendix 1 presenting a grid of how Units comprising each of these Group Awards map to their respective aims.

3.1 General aims of the HNC Group Award

The general aims of this award are to:

1 Enhance candidates' employment prospects.

2 Support candidates' Continuing Professional Development and career development.

3 Enable progression within the SCQF (Scottish Credit and Qualifications Framework).

4 Develop candidates' ability to apply analysis and synthesis skills to the solution of aviation related problems.

5 Develop learning and transferable skills (including Core Skills).

6 Provide (where appropriate) direct coverage of the Civil Aviation Authority's practitioner qualification European Aviation Safety Agency (EASA) — Part 66, thus facilitating a candidate's opportunity to be presented for a variety of EASA modules.

7 Allow the candidate to articulate to the HND in Aircraft Engineering.

3.2 Specific aims of the HNC Group Award

The specific aims of this award are to:

8 Provide an award that will allow candidates to work now, or in the future, within the technology side of the aviation industry.

9 Provide an award that creates a route towards meeting part of the academic requirements for the Civil Aviation Authority's EASA Part 66 qualification.

10 Develop an award that on successful completion will allow candidates to progress to HND Aircraft Engineering and/or a degree in Aviation or related subject discipline area.

11 To provide candidates with a general background in aviation technology but with the opportunity to specialise in either Mechanics (B1 licence area) or Avionics (B2 Licence area).

12 Develop a range of communications knowledge and skills relevant to the needs of aircraft engineers.

13 Develop knowledge, understanding and skills in a range of core aviation principles and technologies at Higher National level.

14 Develop knowledge, understanding and skills to apply an appropriate order to the key aviation areas of: Aerodynamics, Propulsion, Aircraft Structures and Materials.

15 Allow a degree of specialisation within the following areas: Avionics, Aircraft Maintenance or Aircraft Design/Manufacture.

3.3 General aims of the HND Group Award

The general aims of this Group Award are to:

1 Enhance candidates' employment prospects.

2 Support candidates' Continuing Professional Development.

3 Enable progression within the Scottish Credit and Qualifications Framework (SCQF).

4 Develop candidates' ability to apply analysis and synthesis skills to the solution of aviation related problems.

5 Develop learning and transferable skills (including Core Skills).

6 Provide a qualification to meet the aviation industry requirements for aircraft manufacture and maintenance technicians.

7 Allow the candidate to articulate to a variety of degree programs in Aviation or related Engineering.

3.4 Specific aims of the HND Group Award

The specific aims of this Group Award are to:

8 Provide a Group Award that will allow candidates to develop an aviation knowledge base, facilitating their working within the aviation industry now, or in the future.

9 Provide candidates with a general background in aviation technology but with the opportunity to specialise in either airframe and engines (B1 licence area) or Avionics (B2 Licence area).

10 Provide a Group Award that creates a route towards meeting part of the academic requirements for the Civil Aviation Authority's EASA Part 66 qualification.

11 Provide a Group Award that on successful completion will allow candidates to progress to the UHI and degrees in Aviation at other UK universities.

12 Develop candidates' range of specific communications knowledge and skills relevant to the needs of Aircraft engineers.

13 Develop candidates' knowledge and understanding of the external and internal factors that influence the performance of the aviation industry.

14 Recognise the important role that Continuing Professional Development plays in career development within the aviation sector.

15 Expand on the range of knowledge, understanding and skills in core aviation principles developed in the HNC Aircraft Engineering.

16 Provide development of Core Skills (on successful completion of the Group Award, candidates will achieve the Core Skills of *Communication, Problem Solving* and *Numeracy* at SCQF 6).

17 Provide candidates with the opportunity to refine their analytical and problem solving skills, in both technical and non technical subject areas.

18 Provide the opportunity to combine theory with practice, and enable candidates to gain a set of skills serving as a foundation for further development in an aircraft manufacturing or maintenance environment.

19 Provide candidates with the experience of planning and working on a technical task related to the aviation sector.

20 Enhance candidates' employment opportunities within the aviation sector.

21 Develop candidates' knowledge and understanding of key aviation principles.

22 Facilitate candidates' development of mathematics to a level appropriate to progress to degree level.

23 to enable candidates to experience a flexible curriculum by providing topics not studied in the HNC Group Award.

3.5 Target groups

The HNC and the HND Aircraft Engineering are suitable vocational routes to employment within the aviation industry for a range of candidates. It will serve those who wish to progress a career in aircraft engineering, whether they are new entrants to the industry or people already working in the industry.

These candidates for the HNC or the HND Aircraft Engineering include the following:

- School leavers with appropriate qualifications
- Candidates from Further Education
- Candidates from the aircraft industry
- Candidates with relevant experience from other engineering industries

Both the HNC and the HND awards provide candidates with a progression route to degree studies as an alternative to the direct entry route via traditional higher level school leaving qualifications such as the Scottish Higher.

3.6 Employment opportunities

The range of employment opportunities within aircraft engineering in Scotland is documented by Careers Scotland on their website (www.careers-scotland.org.uk), indicating career routes in the following activities of the aircraft industry:

- Aeronautical Research
- Aerospace systems design
- Aerospace systems manufacture
- Aerospace systems Repair and Maintenance

A candidate who is seeking employment on completion of the HNC would be suitable as a junior aircraft maintenance technician or similar role in an aircraft manufacturing environment. Candidates would have achieved a base set of skills and have an appropriate level of understanding to support their development within the aircraft engineering industry to progress towards a more senior technician position.

A candidate who is seeking employment on completion of the HND would be suitable as an aircraft maintenance technician or similar role in an aircraft manufacturing environment. Candidates would have achieved a broad set of skills with deep specialist knowledge and understanding to support their development within the aircraft engineering industry to progress to a position of responsibility; or they may use the substantial generic engineering knowledge and transferable skills development within the HND to follow a career in a different field of engineering – such as technical support or sales for instance.

Candidates wishing to pursue a career in aircraft engineering design or research would be advised to progress to degree level studies.

3.7 Relationship to Sectorial Developments

The HNC or the HND in Aircraft Engineering will amply satisfy the vocational qualification requirement for the Engineering Modern Apprenticeship in respect of aeronautical engineering apprenticeships, as well as providing underpinning knowledge to support the SVQ Level 3 in Aeronautical Engineering. These awards also map to aspects of the educational requirements of the European legislative aviation standards (EASA Part 66) for licensed aircraft engineers.

4 Access to Group Award(s)

4.1 Access requirements

Admission to the HNC and the HND Aircraft Engineering should be based on a broad approach to candidate selection to ensure that no artificial barriers are created to prospective candidates. At the same time, delivery centres should ensure that candidates accepted for the HNC or the HND Aircraft Engineering have a realistic chance of successfully achieving the Group Award within the normal modes of delivery.

In defining a set of knowledge and skills criteria and qualifications for access to the Group Award, it is assumed that most centres will deliver the HNC Aircraft Engineering as the first year of the HND Aircraft Engineering programme, and therefore, that the entry qualifications for the two awards will be the same.

It is recommended that access to the HNC or to the first year of the HND may be gained by:

- Candidates who hold:
  - National Certificate in Aeronautical Engineering
  - National Certificate in Aeronautical Engineering Practice (with additional Mathematics)

- Candidates who hold other qualifications that contribute significantly towards meeting the technological knowledge and skills criteria required. For example:
  - Higher Technological Studies
  - Higher Physics
  - Higher Maths
  - National Certificate in Engineering.
  - National Certificate in Engineering Practice (with additional maths)
  - National Certificate in Electrical Engineering (depending on whether electronic Units are included)
  - National Certificate in Electronic Engineering Practice (with additional mathematics)

- Candidates who have an appropriate level of skills/knowledge as reflected by the possession of a relevant SVQ or work experience may be considered for access to the HNC or to the first year of the HND at the discretion of the centre.

Candidates progressing to, or seeking direct entry to, the 2nd year (full time programme) of the HND, should be in possession of the 15 credits that comprise the 1st year of the programme at a particular delivery centre. Centres will have the discretion to accept candidates who do not meet this requirement, in which a bridging programme of Units may be deemed necessary.

4.2 Recommended Core Skills Entry level

The recommended Core Skills entry level for both the HNC and the HND Aircraft Engineering awards are as follows:

- Communication SCQF level 5
- Information Technology SCQF level 5
- Numeracy SCQF level 5
- Working with Others SCQF level 4
- Problem Solving SCQF level 5

The Core Skills level of entry is one level below the exit level.

4.3 Alternative access arrangements

A delivery centre may operate alternative access arrangements in cases where a candidate may be required to demonstrate competence to meet the Group Award entry criteria in the absence of a qualification listed in 4.1 above. These arrangements may take one or more of the following forms:

- Assessment on demand
- Credit transfer
- Accreditation of Prior Learning
- Portfolio of relevant work experience

Delivery centres employing such alternative arrangements may be required to outline their associated systems as part of any approval procedure.

4.4 Candidates who have English as an additional language

Centres are advised that candidates should have an SQA ESOL qualification at SCQF level 5, or similar, to ensure the suitability of candidates who do have English as an additional language. Centres may consider the inclusion of SQA ESOL provision in the early part of the HNC or the HND Aircraft Engineering course to assist such candidates to achieve success.

5 Group Award structure

5.1 Framework for the HNC Group Award G800 15

HNC Aircraft Engineering

Mandatory Units (64 SCQF credit points)

Unit title	Unit code	SCQF credit points	SCQF level	SQA credit value
Communication: Practical Skills	H7MB 34*	8	7	1
Mathematics and Physics for Aviation	DR0A 33	16	6	2
Aerodynamics	DR0C 34	8	7	1
Aircraft Structures and Materials	DP5P 34	16	7	2
Aircraft Propulsion Systems: Introduction	DR09 34	8	7	1
Aircraft Engineering: Graded Unit 1	DR01 34	8	7	1

*Refer to History of Changes for revision changes.

Restricted optional Units (16 SCQF credit points must be taken from this section)

Unit title	Unit code	SCQF credit points	SCQF level	SQA credit value
EITHER				
Electronic Fundamentals for Aviation	DR07 34	8	7	1
Electrical Fundamentals for Aviation	DR06 34	8	7	1
OR				
Aircraft Hydraulic and Pneumatic Systems	DR02 34	8	7	1
Aircraft Systems: Flight Controls	DR03 34	8	7	1
OR				
Computer Aided Draughting for Engineering	DR1X 34	8	7	1
Statics and Strength of Materials	DR1T 34	8	7	1

Optional Units (a further 16 SCQF credit points required)

Unit title	Unit code	SCQF credit points	SCQF level	SQA credit value
Engineering Mathematics 2	H7K1 34*	8	7	1
IT: Applications Software 1	D75X 34	8	7	1
Engineering Principles	DR3L 34	8	7	1
Practical Aircraft Skills	DP5R 33	8	6	1
Aircraft Electrical and Electronic Skills	DR0D 33	8	6	1
Aircraft Maintenance Skills	DP5L 33	8	6	1
Engineering Skills	DR1V 34	8	7	1
Aircraft Propellers	DP5N 34	8	7	1
Avionics	DR05 34	8	7	1
Aircraft Instruments	DP5M 34	8	7	1
Materials Selection	DT46 34	8	7	1
Engineering Drawing	DR1W 34	8	7	1
Computer Aided Draughting for Engineering	DR1X 34	8	7	1
Design for Manufacture	DR3M 35	8	8	1
Heat Transfer and Fluid Mechanics	DT5T 35	8	8	1
Thermofluids	DT9P 34	8	7	1
Aviation Legislation	DR04 34	8	7	1
Employment Experience 2	D77H 34	8	7	1

*Refer to History of Changes for revision changes.

For a candidate to achieve the HNC Aircraft Engineering, they would require to attain all of the mandatory Units of 64 SCQF credit points (8 SQA credits), 16 SCQF credit points (2 SQA credits) worth of restricted optional Units and further 16 SCQF credit points (2 SQA credits) worth of restricted optional Units and/or optional Units. Please note that there is a minimum requirement of 48 SCQF credit points (6 SQA credits) at SCQF level 7 for an HNC.

5.2 Framework for the HND Group Award

HND Aircraft Engineering

Mandatory Units (96 SCQF credit points)

Unit title	Unit code	SCQF credit points	SCQF level	SQA credit value
Communication: Practical Skills	H7MB 34*	8	7	1
Mathematics and Physics for Aviation	DR0A 33	16	6	2
Aerodynamics	DR0C 34	8	7	1
Aircraft Structures and Materials	DP5P 34	16	7	2
Aircraft Propulsion Systems: Introduction	DR09 34	8	7	1
Engineering Mathematics 2	H7K1 34*	8	7	1
Human Factors for Aircraft Engineering	DR08 34	8	7	1
Aircraft Engineering: Graded Unit 1	DR01 34	8	7	1
Aircraft Engineering: Graded Unit 2	F1FX 35	16	8	2

Restricted optional Units (48 SCQF credit points must be taken from this section)

Unit title	Unit code	SCQF credit points	SCQF level	SQA credit value
Aircraft Electrical Power Systems	F0YB 35	8	8	1
Aircraft Electronic Techniques	F0M4 35	8	8	1
Aircraft Servo Control Systems	F0M1 35	8	8	1
Aircraft Automatic Flight and Landing Systems	F0M2 35	8	8	1
Radio and Radar Principles for Aviation	F0M9 35	16	8	2
Aircraft: Environmental Systems: Cabin Conditioning and Pressurisation	F0M5 35	8	8	1
Aircraft: Landing Gear	F0M8 35	8	8	1
Aircraft: Inspection and Repair	F0M7 35	8	8	1
Communication and Navigation Systems for Aviation	F0M3 35	16	8	2
Aircraft Gas Turbine Engines	F0M6 35	16	8	2
Computer Aided Engineering and Prototyping	DR1R 35	16	8	2

*Refer to History of Changes for revision changes.

Optional Units

Unit title	Unit code	SCQF credit points	SCQF level	SQA credit value
Electronic Fundamentals for Aviation	DR07 34	8	7	1
Electrical Fundamentals for Aviation	DR06 34	8	7	1
Engineering Principles	DR3L 34	8	7	1
Practical Aircraft Skills	DP5R 33	8	6	1
Aircraft Electrical and Electronic Skills	DR0D 33	8	6	1
Aircraft Maintenance Skills	DP5L 33	8	6	1
Engineering Skills	DR1V 34	8	7	1
Aircraft Systems: Flight Controls	DR03 34	8	7	1
Aircraft Propellers	DP5N 34	8	7	1
IT: Applications Software 1	D75X 34	8	7	1
Aircraft Hydraulic and Pneumatic Systems	DR02 34	8	7	1
Avionics	DR05 34	8	7	1
Aircraft Instruments	DP5M 34	8	7	1
Materials Selection	DT46 34	8	7	1
Engineering Drawing	DR1W 34	8	7	1
Computer Aided Draughting for Engineers	DR1X 34	8	7	1
Design for Manufacture	DR3M 35	8	8	1
Statics and Strength of Materials	DR1T 34	8	7	1
Dynamics	DT9T 34	8	7	1
Heat Transfer and Fluid Mechanics	DT5T 35	8	8	1
Thermofluids	DT9P 34	8	7	1
Aviation Legislation	DR04 34	8	7	1
Employment Experience 2	D77H 34	8	7	1
Business Awareness and Continuing Professional Development	DG3D 35	8	8	1
Mathematics for Engineering 3	DG4P 35*	16	8	2
CNC	DT5P 34	8	7	1
Computer Aided Manufacture	D4FX 34	8	7	1
Engineering Mathematics 3	H7K2 34*	8	7	1
Engineering Mathematics 4	H7K3 34*	8	8	1
Engineering Mathematics 5	H7K4 34*	8	8	1

*Refer to History of Changes for revision changes.

For a candidate to achieve the HND Aircraft Engineering, they would require to attain all of the mandatory Units of 96 SCQF credit points (12 SQA credits), 48 SCQF credit points (6 SQA credits) of restricted optional Units and 96 SCQF credit points (12 SQA credits) of restricted optional Units and/or optional Units. Please note that there is a minimum requirement of 64 SCQF credit points (8 SQA credits) at SCQF level 8 for an HND.

5.3 Graded Units

There are two mandatory Graded Units within the HND framework worth a total of 3 credits, of which the single credit Graded Unit 1 is common to the HNC framework. The purpose of the Graded Units is to assess the candidate's ability to apply and to integrate knowledge and skills gained through prime individual Units within the framework. By this means, candidates will be able to demonstrate that they have achieved the aims of the Group Award as detailed in Section 3.1 to 3.4. The Graded Units also provide a means of grading a candidate's overall achievement of the Group Award.

Graded Unit 1 (1 credit at SCQF 7), which is also a mandatory Unit within the HNC framework, is assessed by two 1.5-hour written examinations covering subject material from the following mandatory Units:

- Physics and Mathematics for Aviation
- Aerodynamics
- Aircraft Structures and materials
- Introduction to Aircraft Propulsion Systems

The Graded Unit 1 assessment is based on two written examination papers. It is recommended that tutoring for this Graded Unit is organised to ensure that specialists are available for each of the constituent Units.

Graded Unit 2 (2 credits at SCQF 8) takes the form of a project-based assignment which seeks to assess skills in the following areas:

- Extend technical knowledge and skills related to specific aircraft engineering applications
- Apply complex communication in an engineering context
- Work effectively as a team member
- Apply ICT solutions to engineering problems
- Apply problem solving and planning skills to a complex aircraft engineering application

5.4 Core Skills

5.4.1 Core Skills Exit profile

The recommended Core Skills profile of a candidate on entry is common for both the HNC and the HND Aircraft Engineering and is shown in Section 4.2.

A candidate who successfully achieves an HNC Aircraft Engineering will have the opportunity to achieve and/or develop Core Skills to SCQF level 6 in the following areas:

- Communication certificated at SCQF level 6
- Numeracy certificated at SCQF level 6
- IT Signposted at SCQF level 6
- (Certificated if the optional Unit in *IT: Applications Software* is selected)
- Working with Others signposted at SCQF level 6, particularly if the practical skills Units are selected
- Problem Solving Signposted SCQF level 6

A candidate who successfully achieves the HND Aircraft Engineering will have the opportunity to achieve and/or develop Core Skills to SCQF level 6 in the following areas:

- Communication certificated at SCQF level 6
- Numeracy certificated at SCQF level 6
- IT signposted at SCQF level 6
- (Certificated if the optional Unit in IT: *Applications Software* is selected)
- Working with Others signposted at SCQF level 6 particularly through the practical skills Units
- (Certificated if the optional *Employment Experience 2* is selected)
- Problem Solving signposted at SCQF level 6

Core Skills development opportunities

The Communications and optional IT and Employment Experience Units carry embedded Core Skills. All of the other Units that constitute the Group Award provide the candidate with opportunities to develop Core Skills. It was the decision of the Qualifications Design Team not to separately seek certification of individual Core Skill elements and rather to concentrate on the aviation technology elements of the course. This does not of course preclude candidates from themselves seeking individual Core Skill certification utilising in part the evidence developed in the course Units if they wish. Appendix 2 gives further details of Core Skills development opportunities by Unit and by Core Skill grouping.

5.5. Mapping information

5.5.1 Aims of the Group Award

Appendix 1 gives an indication of the individual Units map to the aims of the Group Award.

5.5.2 Core Skills development

Mapping of Core Skills development opportunities is detailed in Appendix 2.

5.5.3 National Occupational Standards

The content and context of the HND Aircraft Engineering cross-cuts a range of different industry occupational areas such as business management and IT Users as well as the prime target occupational area of aircraft engineering. For Engineering, the National Occupational Standards have been contextualised by SEMTA.

Appendix 3 indicates areas of the HND that support the National Occupational Standards that are embodied within the SVQ Level 3 in Aeronautical Engineering. The relevant National Occupational Standards for this mapping exercise were sourced from the UK Standards web site.

This mapping emphasises the substantial contribution of this HND in meeting the knowledge criteria of the Modern Apprenticeship for Aircraft Engineering.

5.6 Articulation, professional recognition and credit transfer

5.6.1 Progression to Degree Studies

Candidates who complete the HNC or the HND Aircraft Engineering may progress to degree studies at a variety of universities who offer aircraft engineering. Entry to the degree programme can attract an amount of advanced standing. For an HNC, it may be possible to gain entry into year 2 of an Honours degree programme. In the case of an HND, entry to either year 2 or year 3 of an Honours degree programme may be possible dependent upon the view of the receiving university.

Specific articulation into the 3rd year of the UHI BSc degree in Aircraft Engineering has been built-in to the HND Group Award design.

5.6.2 Recognition by Professional Bodies

The HNC and the HND Group Awards are recognised as contributing towards meeting the requirements of Engineering Technician registration with the Engineering Council through an affiliated professional institution such as the Royal Aeronautical Society. The Group Awards also partially satisfies the educational requirement for registration as an Incorporated Engineer.

Recognition by the Civil Aviation Authority (CAA) is expected to yield some exemptions from the full technical syllabus for a licensed aircraft certifying mechanic.

5.6.3 Credit transfer arrangements

The Aircraft Engineering Qualifications Design Team has taken the view that individual Unit transfer is possible in accordance with the Unit transfer grid outlined in Appendix 4. This ensures candidates can gain credit for Units studied under the previous HNC/HND in Engineering: Aeronautical.

New Unit Title	New Unit Code	Old Unit Title	Old Unit Code	Credit Transfer Conditions
Engineering Mathematics 1	H7K0 33	Mathematics for Engineering 1: Electronics and Electrical	DG4H 33	To gain credit transfer to the new unit candidates will have to provide additional evidence relating to functions as specified in the Evidence requirements in respect of the first three knowledge/skills in Outcome 1 and relating to vectors as specified in the first three knowledge/skills in outcome 3.
Engineering Mathematics 1	H7K0 33	Mathematics for Engineering 1: Mechanical and Manufacturing	DT5X 33	To gain credit transfer to the new unit candidates will have to provide additional evidence relating to functions as specified in the Evidence requirements in respect of the first three knowledge/skills in Outcome 1 and relating to 3D vectors and complex numbers as specified in the knowledge/skills in outcome 3.

Engineering Mathematics 2	H7K1 34	Mathematics for Engineering 2	DG4L 34	To gain credit transfer to the new unit candidates will have to provide additional evidence relating to trigonometric and hyperbolic functions as specified in the Evidence requirements in respect of Outcome 1.

6 Approaches to delivery and assessment

6.1 Context and content

A high priority of both the HNC Aircraft Engineering and the HND Aircraft Engineering is to develop the technical knowledge and practical skills relevant to the needs of the modern aircraft engineering industries. In this respect, the content and structure of each Group Award has been designed to give delivery centres the ability to provide a course that prepares candidates for careers in the design, manufacturing or maintenance environments of the aircraft industry. The HNC provides a strong emphasis on core aircraft engineering principles and technology while the HND provides advanced principles and technology across a broader range of disciplines to allow greater specialisation. Flexibility within these Group Awards, especially at HND level, allows courses to be devised to provide specific aircraft engineering bias along one or more of the following specialisations:

- Airframes and Engines
- Mechanical Systems
- Avionic Systems

This flexibility is achieved through a Group Award framework comprising a mandatory core section, a restricted core section and options section.

For the HNC:

The Units comprising the mandatory core provide the essential fundamental aircraft engineering principles together with a sound grounding in communications and mathematics necessary to prepare for the more advanced studies later in the programme.

Units within the restricted core allow the flexibility for centres to start the process of specialist develop of their candidates along the separate routes of Avionics, Mechanical Systems or Manufacturing technician.

A wide range of optional Units allow for the limited further development along chosen specialist routes as centres see fit to suit their candidates within the broad aircraft engineering areas of Design, Manufacturing and Maintenance. Within this optional section there are also Units that develop knowledge of Mathematics and aviation legislation as well as employability skills.

For the HND:

The Units comprising the mandatory core provide the essential fundamental aircraft engineering principles together with a sound grounding in communications and mathematics necessary to prepare for the more advanced studies later in the programme. Market research confirmed that knowledge of Human Factors in aircraft engineering is an essential requirement of the industry and so is also included in the mandatory core.

Units within the restricted core allow the flexibility to develop deep knowledge in selected specialist areas such as Airframes and Engines, Mechanical Systems or Avionics. Specialist Units within this section also allow for a broadening of candidates skills outside technological subjects, such as Business Awareness and a higher level mathematics Unit.

A wide range of optional Units allow for the development of specialist practical skills in the broad aircraft engineering disciplines of Design, Manufacturing and Maintenance. Within this optional section there are also Units that develop knowledge of aviation legislation as well as employability skills.

It is recommended that candidates wishing to progress to degree level, undertake the Unit Mathematics for Engineering 3, which is available within the restricted core section but could also be selected as a wider optional Unit.

The mandatory Communications and Mathematics Units will yield specific certification of Core Skills in these subjects. There is no mandatory IT Unit required by the Group Award criteria although a Unit within the optional section, IT Applications Software, will yield specific Core Skills certification in IT if selected within the HNC or the HND programme.

6.2 Delivery

6.2.1 Modes of delivery

The HNC Aircraft Engineering and the HND Aircraft Engineering can both be delivered on a full-time, part-time day/evening, or block release basis. Centres' capacity to deliver this Group Award on an Open or Blended Learning basis will depend upon the availability of learning materials suitable for these modes of delivery.

In timetabling the qualification, centre staff should take account of information contained in the Recommended Prior Knowledge and Skills statement in Unit specifications when sequencing the delivery of Units.

A suggested delivery sequence of Units to achieve the HND Aircraft Engineering via a full-time two-year programme is presented in Appendix 5. A common Year 1 programme is suggested for all specialisations to achieve the HNC Aircraft Engineering. Three separate suggestions for Year 2 programmes are presented to show how a course might be biased toward the knowledge and skills for either aircraft mechanical systems maintenance, aircraft avionic systems maintenance or for aircraft design and manufacturing applications.

This information is presented for delivery on the basis of either a 3-Block or a 2-Semester academic session.

6.2.2 Approaches to Learning and Teaching

Lecturers should use a variety of learning and teaching approaches in the delivery of the Units for the HNC and the HND. These may include lectures, tutorials, laboratory work, workshop exercises, computer simulations, case studies, group assignments and project activities. Comprehensive use of student-centred practical work, both laboratory and workshop, should be integrated in to the course delivery in recognition of the high value learning stemming from hands-on activities. The use of open learning and on-line materials is suggested to supplement formal teaching and to promote independent learning. Centres are also encouraged to develop their wider capability to deliver appropriate elements by making use of e-activities for learning and assessment.

Lecturers should also seek to integrate Core Skills development opportunities at every possibility within the learning and teaching programme. Suggested opportunities for Core Skills development are indicated in Appendix 2.

Industrial visits are encouraged wherever possible to provide actual insight into real working environments and applications within the aircraft engineering business that endorses college learning.

6.3 Assessment

6.3.1 Assessment strategy

The Qualification Design Team has sought to reduce the time candidates have to spend on summative Unit assessment. With less summative assessment, lecturers should be provided with more time to deliver Units and are encouraged in particular, to use this additional time to reinforce learning in mandatory subjects and enhance the development of candidates' practical skills for aircraft engineering. Formative assessment is recommended throughout the delivery of Units to reinforce learning, build candidates' confidence and prepare candidates for summative assessment.

From the outset of developments the Qualification Design Team recognised the need to have an appropriate assessment strategy in place for the HNC and for the HND Aircraft Engineering Group Awards. Such a strategy is outlined below:

Aims

The aims of the strategy are to ensure that:

(1) consistent, rigorous and efficient approaches are adopted to the development and administration of HN Aircraft Engineering assessment instruments at both Unit and Graded Unit level, which satisfy nationally agreed standards.

(2) the assessment load on candidates and staff is sensible and assessment does not unduly detract from teaching and learning. A sample assessment schedule is included in appendix F.

(3) reliable and rigorous moderation processes are put in place in order to ensure that consistent national standards are achieved for HN Aircraft Engineering assessments.

Objectives

Listed below are the measures that have been put in place to meet the aims:

(1) Develop nationally at least one assessment pack for each mandatory Unit, which clearly sets out the standards of assessment expected in the Unit.

(2) Adopt a holistic approach to Unit assessment. The implications of this are as follows:

(i) Assessment instruments will normally be designed only to sample knowledge and skills in a Unit (this is consistent with the new HN Unit format).

(ii) A Unit assessment strategy will be adopted, where possible, to produce a single assessment instrument for the whole Unit. Where this is not possible the assessment strategy will seek to ensure that the minimum number of assessment instruments are required consistent with maintaining agreed national standards.

(3) Whilst not seeking to be entirely prescriptive with regard to the time spent on assessment in each HN Unit, over assessment should be avoided if the following guidelines are adopted for the maximum time spent on HN Unit assessment:

One and half-hours per Unit credit for HN Units at SCQF levels 6 and 7 and two hours per level 8.

(4) Produce an assessment for the Aircraft Engineering: Graded Unit 1 and 2 that sets the standards expected in such a paper so that assessors can distinguish between Grades A, B and C.

(5) Actively encourage delivering centres to work in partnership in producing Graded Unit assessment materials, which meet nationally agreed standards reducing, in turn, the workload on staff in individual centres.

(6) Ensure that consistent and rigorous internal and external moderation procedures operate throughout at Unit and Graded Unit level. This places a clear responsibility on both centres and the SQA.

As far as has been practical the above objectives have been adhered to when developing assessment exemplar and Graded Unit materials.

6.3.2 Graded Unit management

Graded Unit 1 is comprised of 2 closed-book examinations each of 1.5 hours duration which will be administered at the end of the first year of a full-time programme. It is recommended that formative tutoring in preparation for the examination be planned for the 12 weeks immediately prior to the examination date.

It is recommended that the Graded Unit 2 project be planned within the Unit delivery sequence to run throughout Block 2 and Block 3, or Semester 2, of Year 2 of a full-time programme.

The suggested Unit sequence information given in Appendix 5 takes due cognisance of Unit delivery in relation to the candidates timely accumulation of knowledge and skills in preparation for the Graded Unit 1 (Year 1) and Graded Unit 2 (Year 2).

6.3.3 Assessment Exemplar materials

Exemplar assessments are planned for all the mandatory core Units, including the Graded Units for the HNC and the HND awards.

6.4 Resources

6.4.1 Practical resource requirements

Individual Unit specifications highlight the specific physical resources that are essential to the delivery of a Unit.

While not all Units require practical activities, centres are strongly recommended to provide candidates with access to appropriate laboratory and workshop facilities to supplement classroom teaching and to develop practical skills relevant to aircraft engineering. Access to laboratories for thermofluids, materials and avionics testing together with workshops for mechanical, electrical and electronic construction and maintenance should be considered as highly desirable to provide the thorough vocational education to HND level for aircraft engineering.

Highly desirable electronic based resources for learning in a modern teaching environment will include:

- Computer availability with internet access
- Projection systems for teaching
- CDs/DVD for independent learning
- Virtual Learning Environment

A good range of aircraft engineering textbooks for candidate use is essential.

6.4.2 Staff development

In an ever-changing technological environment such as aircraft engineering, it is essential that lecturers are active in structured personal CPD to support the delivery of the HNC and the HND Group Awards in context to modern sector practices and developments. Suggested areas for CPD are listed below, but are not intended to be exhaustive:

- Use of industry standard software for specialist applications
- Advances in materials development for aircraft use
- Advances in manufacturing techniques
- Advances on avionic systems technology
- New approaches to learning and teaching (e-learning and assessment)
- New and revised occupational standards
- New and revised legislation

7 General information for centres

Candidates with disabilities and/or additional support needs

The additional support needs of individual candidates should be taken into account when planning learning experiences, selecting assessment instruments, or considering alternative Outcomes for Units. Further advice can be found in the SQA document *Guidance on Assessment Arrangements for Candidates with Disabilities and/or Additional Support Needs* **(www.sqa.org.uk)**.

Internal and external verification

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

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

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

8 General information for candidates

The HNC and HND qualifications in Aircraft Engineering are designed to allow candidates to develop their knowledge, understanding and practical skills to meet the needs of a person wanting to embark on a career in the modern aircraft engineering business, whether this be in aircraft design and manufacturing industries or aircraft operators/maintenance and repair organisations. The qualifications provide a general background in aviation technology while allowing candidates to specialise in main areas such as airframes and engines or avionics, or both.

The qualifications more than satisfy the knowledge requirement for the Engineering Modern Apprenticeship. They also create a route towards candidates' being able to meet part of the academic requirements of the European Aviation Safety Authority (EASA) for licensed aircraft maintenance mechanics, as well as UK Engineering Council registration as an Engineering Technician. Successful completion of this HNC or HND will allow you to apply for advanced standing entry into aircraft engineering degrees at a range of UK universities. To meet such articulation criteria it will normally be required that a candidate wishing to progress to degree studies completes the Unit *Mathematics for Engineering 2* within the HNC course and the Unit *Mathematics for Engineering 3* within the HND course.

The HND is recognised by the Engineering Council as meeting the requirements for registration as an Engineering Technician, while the HNC goes part way to meeting this requirement.

Access to these courses is fully inclusive. However, to ensure that candidates have a realistic potential for success on the course it is recommended that they should have one of the following qualifications before entering the HNC and HND Aircraft Engineering:

(1) Two Highers from the following list: Electronics, Electrical Engineering, Technological Studies, Craft and Design, Physics or Mathematics.

(2) A National Certificate in Aircraft Engineering or Aeronautical Engineering (Practice) with appropriate Mathematics.

(3) Equivalent qualifications or experience to those shown in (1) and (2).

The new HNC Aircraft Engineering and HND Aircraft Engineering can be delivered on a full-time, block-release, open or blended learning, part-time day or part-time evening basis at the discretion of delivery centres. SQA centres who offer this HND Group Award on a full-time basis may deliver the HNC in Aircraft Engineering as the first year of the course. Candidates should check with individual SQA centres to confirm their own specific arrangements for delivering the HND Aircraft Engineering.

The SQA HNC qualification is a 12 credit course with the majority of Units at SCQF Level 7. The Unit content of the qualification is divided into an 8 HN credit mandatory section plus two further credits selected from a restricted options section with an additional 2 credits selected from a wide list of optional Units. Subjects in the mandatory section include *Mathematics and Physics for Aviation, Aerodynamics, Aircraft Structures and Materials,* and *Aircraft Propulsion Systems*. The restricted options section and the fully optional Units allow delivery centres to mould their HNC along a specialist aircraft engineering such as avionics, airframe and engines or aircraft systems.

This SQA HND qualification is a 30 credit course with the majority of the Units at SCQF levels 7 and 8. The material content of the qualification is divided into a 12 HN credit mandatory section, a minimum of 6 HN credit restricted core section and a further 12 HN credits of Units selected at the discretion of the SQA centre to meet needs of their candidates. Subjects in the mandatory section include *Mathematics and Physics for Aviation, Aerodynamics, Aircraft Structures and Materials*, and *Aircraft Propulsion Systems*. The restricted core and optional Units provide the opportunity for centres to specialise in other flight system subjects vital to aircraft operation, as well as giving a course bias towards Design and Manufacturing or Repair and Maintenance. Within these options are opportunities to develop the practical aircraft workshop skills as well as non-technical subjects such as human factors in aircraft engineering.

Aircraft Engineering is very much about learning and understanding core principles and technologies whilst also undertaking practical work such as component manufacture, system inspection and testing, and project work. Thus a variety of learning and teaching approaches in delivering the Units in the HNC and the HND Aircraft Engineering Group Awards will be employed. These may include lectures, tutorials, group work, laboratory and aircraft related practical work, computer simulation, project work and case studies. The use of flexible learning through on-line materials may be used to supplement and support the learning that takes place in the college. Industrial visits are encouraged wherever possible to provide 'real life' industrial examples of the application of the theory and practice learnt in the classroom, laboratory or workshop and to promote interaction with practitioners.

As well as studying aviation subjects candidates will also develop a range of Core Skills. The transferable range of Core Skills includes *Communication, Working with Others, Problem Solving* and *Numeracy*. Many of the aviation related Units provide candidates with the opportunity to develop their Core Skills and some which carry certification for individual Core Skills as part of the HNC and the HND.

The assessment strategy of the qualification has been devised so that sufficient time is available for candidates to learn the aviation principles and technologies as well as to develop the practical skills that are essential to being a good aviation technician. Candidates can expect to undertake assessment at individual Unit level and at qualification level. Unit level assessment is continuous and will take a variety of forms such as written and numerical tests, assignment exercises, case studies, laboratory work practical workshop exercises. SQA delivery centres will have assessment plans available to inform candidates of the format that Unit assessment will take.

The HNC Group Award requires that candidates undertake a Graded Unit. This Graded Unit 1 is a written examination timed to be taken at the end of the HNC course.

For the HND Group Award, there are two Graded Units. Graded Unit 1 is the same written examination that is set for the HNC Group Award and would normally be timed to be taken at the end of the first year of a Full Time course. Graded Unit 2 is project-based activity specialising on a relevant aircraft engineering development and undertaken during the second year of the HND.

9 Glossary of terms

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

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

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

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

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

Dedicated Core Skill Unit: This is a Unit that is written to cover one or more particular Core Skills, eg HN Units in Information Technology or Communications.

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/D from its inception/revision through to validation. The group is made up of key stakeholders representing the interests of centres, employers, universities and other relevant organisations.

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

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

10 Appendices

Appendix 1 Mapping of How the Aims of the Group Award are Met
Appendix 2 Mapping of Core Skills development opportunities
Appendix 3 Mapping of National Occupational Standards
Appendix 4 Credit transfer arrangements
Appendix 5 Suggested Unit delivery sequence

Appendix 1: Mapping of How the Aims of the Group Award are Met

Mapping of How the Aims are met within the HNC and the HND Group Awards Structure and Content are presented separately below for each Group Award

1A How the General aims are met for the HNC Group Award

Aim No.	How it is met in HNC
1	It has been a primary aim in the design of the new HNC Aircraft engineering award to closely align the course framework with industry training requirements with respect to the EASA IR Part 66 syllabus. The new Units have been specifically designed to provide partial coverage of the IR Part 66 syllabus. This will enhance and increase the employment prospects of candidates within the aircraft industry.
2	Candidates in employment will have the opportunity to take the HNC Aircraft Engineering award on a part-time or flexible basis, thus supporting their Continuing Professional Development with respect to their employer and individual needs. Whilst the program has been developed as an HNC, it is conceivable that an individual could take an individual Unit or group of Units to prepare them for EASA IR Part 66 examinations. The course framework is up to date and relevant to the aircraft industry training requirements. The award will support candidates in their individual discipline requirements as it gives them the opportunity to specialise in Mechanic or Avionics engineering. The programme will also allow candidates to pursue design and manufacturing within the options.
3	All Units within the new HNC Aircraft Engineering award have been levelled at SCQF levels 6 or 7. The new award also conforms to the SQA levelling requirements for HNC awards. Thus, successful completion of the HNC Aircraft Engineering will allow progression within the SCQF.
4	The award aims to develop and apply their skills in personal management, knowledge acquisition, problem analysis, deductive skills and evaluation of solutions in preparation for: ♦ a career in Aircraft engineering ♦ a career within the engineering sector ♦ a management role in the aircraft industry ♦ life-long learning and an appreciation of the value of education in continuing professional development
5	Many of the transferable/higher level skills are an integral part of each Unit of study. The HNC provides opportunities for candidates to develop learning and transferable skills in Core Skill areas such as: ♦ communicating effectively in writing, verbally and through graphical representations ♦ application and interpretation of mathematical/numerical skills to the solution of problems
6	A candidate undertaking this award could be given the opportunity to take relevant subject examinations of the Part 66 syllabus in line with CAA requirements taken in an EASA 147 approved centre.
7	The HNC Aircraft Engineering award is designed with the intention of being available to centres as the first year of a two year HND Aircraft Engineering course. The HNC Units will be embedded in the HND thus allowing candidates a seamless progression from HNC to HND.

1B How the Specific aims are met for the HNC Group Award

Aim No.	How it is met in HNC
8	The HNC Aircraft Engineering award aims to provide the breadth of learning and skills for candidates to meet the future needs of a rapidly changing technological and commercial environment.
9	As described in section 2.1.1 the Qualification Development Team for this award has, since its inception, worked from the EASA IR Part 66 academic syllabus. Units for the HNC have been designed to match entirely, or give coverage in part of EASA IR Part 66 modules. This has ensured that the award allows a candidate a route towards meeting a major part of the academic requirements for the Civil Aviation Authority's EASA IR Part 66 qualification.
10	Whilst being a stand alone award the new HNC Aircraft Engineering also follows SQA's HN design principles in forming the first year of a HND award. Candidates successfully achieving the HNC Aircraft Engineering award could progress to the second year of a HND in Aircraft Engineering.
11	The 12 credit HNC Aircraft Engineering award is designed with 7 credits of general aviation technology allowing learners to gain knowledge and understanding across a range of fundamental aircraft engineering topics. Candidates will then have the opportunity to specialise in their chosen field of Mechanics (B1) or Avionics (B2) with a further 2 credits. The options section of the HNC framework allows 2 more credits to be taken across a range of Aircraft or engineering subjects either in the same specialisation or outwith this as the candidate chooses.
12	The HNC framework provides opportunities for learners to achieve knowledge and skills in communicating effectively in writing, verbally and through graphical representations, sourcing information and applying communication skills to the interpretation and solution of problems. Candidates will study the group processes involved in group decision making, how to progress activity, the uses and formats of record keeping and how to contribute effectively to formal group discussions. These transferable skills, developed in this award, will be useful to candidates during the course and in his/her working life.
13	The acquisition of knowledge, understanding and skills at Higher National level can be evidenced in a range of core aviation areas where learners: ♦ apply Aircraft engineering principles to the solution of assignment tasks, applications and problems ♦ analyse, evaluate and interpret engineering data ♦ model by calculation ♦ conduct laboratory experiments to investigate engineering principles and properties of devices and systems ♦ prepare descriptive, interpretive and evaluative technical reports

Aim No.	How it is met in HNC
14	Learners will have the opportunity to develop knowledge, understanding and skills to apply a structured approach to the Aerodynamics, Propulsion, Aircraft Structures and Materials Units by undertaking individual activities, practical sessions and within directed private study. Acquisition of knowledge will be by means of lectures, investigative exercises involving searching of various sources, directed reading and further reading. Pre-written notes will have a role in supporting these activities together with Aircraft manuals, CDs and appropriate Internet resources. Understanding will be developed and reinforced through a variety of activities including laboratory experiments, tutorials, formative and summative assessments.
15	The new HNC Aircraft Engineering framework has been designed with Mechanics (B1 licence area) or Avionics (B2 licence area) specialist routes and a Manufacturing route as outlined in section 2.2.4. Candidates may select a further two optional credits which could extend this specialism to four credits within their 12 credit course. Alternatively candidates could broaden their knowledge and understanding into a wider engineering related curriculum.

2A How the General aims are met for the HND Group Award

Aim No.	How it is met in HND Aircraft Engineering
1	It has been a primary aim in the design of the new HND Aircraft engineering Group Award to align closely the course framework with industry training requirements with respect to the EASA IR Part 66 syllabus. The new Units have been specifically designed to provide partial coverage of the IR Part 66 syllabus. This will enhance and increase the employment prospects of candidates within the aircraft maintenance industry.
2	Candidates in employment will have the opportunity of taking the HND Aircraft Engineering Group Award on a part-time or flexible basis, thus supporting their Continuing Professional Development with respect to their employer and individual needs. Whilst the program has been developed as an HND, it is conceivable that an individual could take an individual Unit or group of Units to prepare them for EASA IR Part 66 examinations. The course framework is modern and relevant to the aircraft industry training requirements. The Group Award will support candidates in their individual discipline requirements as it gives them the opportunity to specialise in Mechanics or Avionics engineering. The programme will also allow candidates to pursue design and manufacturing within the options.
3	A number of Units within HND Aircraft Engineering Group Award have been levelled at SCQF level 8. The Group Award conforms to the SQA's 2003 Design Principles requirements for HND awards. Thus, successful completion of the HND Aircraft Engineering will allow progression within the SCQF.
4	The Group Award aims to develop and apply candidates' skills in personal management, knowledge acquisition, problem analysis, deductive skills and evaluation of solutions in preparation for: ♦ a career in Aircraft engineering ♦ a career within the engineering sector ♦ a management role in the aircraft industry ♦ lifelong learning and an appreciation of the value of education in continuing professional development
5	Many of the transferable/higher level skills are an integral part of each Unit of study. The HND provides opportunities for candidates to develop learning and transferable skills in these Core Skill areas: ♦ *Communication*, communicating effectively in writing, verbally and through graphical representations ♦ *Numeracy*, for example application and interpretation of mathematical/numerical skills to the solution of problems ♦ *Information Technology*, for example when using computer simulation ♦ *Problem Solving*, for example within the design aspect of the HND ♦ *Working with Others*

Aim No.	How it is met in HND Aircraft Engineering
6	This Group Award has been devised to produce flexible course programming to tailor a course to meet specific needs of the aircraft manufacturing and maintenance industries with centres able to bias a course towards airframe/engines or avionics disciplines to suit their candidates' needs. A candidate undertaking this Group Award could be given the opportunity to take relevant subject examinations of the Part 66 syllabus in line with CAA requirements taken in an EASA 147 approved centre.
7	This HND Aircraft Engineering course provides a clear route to the new UHI degree in Aviation as well as articulation opportunities to Aviation degrees offered by a number of other universities.

2B How the Specific aims are met for the HND Group Award

Aim No.	How it is met in HND
8	Learners will have the opportunity to develop knowledge, understanding and skills to apply a structured approach to the Aerodynamics, Propulsion, Aircraft Structures and Materials Units by undertaking individual activities, practical sessions and within directed private study. Acquisition of knowledge will be by means of lectures, investigative exercises involving searching of various sources, directed reading and further reading. Pre-written notes will have a role in supporting these activities together with Aircraft manuals, CDs and appropriate internet resources. Understanding will be developed and reinforced through a variety of activities including laboratory experiments, tutorials, formative and summative assessments.
9	The 30 credit HND Aircraft Engineering Group Award is designed with 12 credits of general aviation technology allowing learners to gain knowledge and understanding across a range of fundamental aircraft engineering topics. Candidates will then have the opportunity to specialise in their chosen field of Mechanics (B1) or Avionics (B2) or to encompass a broader range of skill that covers elements of the Mechanics, Avionics or Manufacturing disciplines. The options section of the HND framework allows 18 more credits to be taken across a range of Aircraft or engineering subjects either in the same specialisation or out with this as the candidate chooses.
10	As described in section one the Qualification Design Team for this Group Award has, since its inception, worked from the EASA IR Part 66 academic syllabus. Units for the HND have been designed to match entirely, or give coverage in part of EASA IR Part 66 modules. This has ensured that the Group Award allows a candidate a route towards meeting a major part of the academic requirements for the Civil Aviation Authority's EASA IR Part 66 qualification.
11	Whilst being a stand alone Group Award the HNC Aircraft Engineering also follows SQA's HN design principles in forming the first year of a HND Group Award. Candidates successfully achieving the HND Aircraft Engineering Group Award could progress to the final year of the UHI Degree in Aeronautical Engineering.

Aim No.	How it is met in HND
12	The HND framework provides opportunities for learners to achieve knowledge and skills in communicating effectively in writing, verbally and through graphical representations, sourcing information and applying communication skills to the interpretation and solution of problems. Candidates will study the processes involved in group decision making, how to progress activity, the uses and formats of record keeping and how to contribute effectively to formal group discussions. These transferable skills, developed in this Group Award, will be useful to candidates during the qualification and in his/her working life.
13	The acquisition of knowledge, understanding and skills at Higher National level can be evidenced in a range of core aviation areas where learners: ♦ apply Aircraft engineering principles to the solution of assignment tasks, applications and problems ♦ analyse, evaluate and interpret engineering data ♦ model by calculation ♦ conduct laboratory experiments to investigate engineering principles and properties of devices and systems ♦ prepare descriptive, interpretive and evaluative technical reports
14	This course has a clear focus on industry requirements of which Continued Professional Development (CPD) is a priority. Two Units that specifically contribute to emphasising this feature are Business Awareness and CPD, and Human Factors.
15	The new HND Aircraft Engineering framework has been designed to allow candidates to specialise with Mechanics (B1 licence area), Avionics (B2 licence area) or Manufacturing areas or to take a broader approach as outlined in section 4. Candidates may select a further 18 (although 6 credits must be at level 8) optional credits which could extend their specialism within their 30 credit course. Alternatively candidates could broaden their knowledge and understanding into a wider engineering related curriculum.
16	The *Communication* and *Information Technology* Core Skills at SCQF level 6 have been incorporated into the HND Aircraft Engineering Group Award through the mandatory core Unit *Communication: Practical Skills* and the optional credit *Information Technology: Application Software* respectively. The component Using Number of the Core Skill *Numeracy* at SCQF level 6 is embedded* within the Units — *Mathematics and Physics for Aviation, Mathematics for Engineering 2* and *Mathematics for Engineering 3*. The Core Skill of *Problem Solving* at SCQF level 6 is embedded within the 2 credit HND Graded Unit*. Candidates may achieve the Core Skill *Working With Others* at SCQF level 6 if selecting optional Unit Employment Experience 2. Opportunities to develop the Core Skill component Using Graphical Information at SCQD level 6 are signposted within individual Unit specifications. *To be confirmed by SQA Core Skill Audit in May 2007.

Aim No.	How it is met in HND
17	The nature of Aircraft Engineering as a discipline lends itself to both the analysis and synthesis of problems. For example, when a complex aircraft system is analysed (using, say, a block diagram approach) by breaking it down into separate functional parts or alternatively the synthesis of a complex system from simpler aircraft subassemblies. The new Group Award allows these important skills to be developed further both in the technical subjects, the mandatory subject relating to communication and the optional Units, Information Technology: Applications Software and Business Awareness and Continuing Professional Development Units.
18	The new HNC and HND Aircraft Engineering awards provide centres with an opportunity to enhance learning skills not least by creating opportunities for candidates to combine theory and practice to achieve a real understanding of a subject. For example, some Units recommend significant use of practical work and/or computer simulation to reinforce learning. It is also anticipated that centres will use innovative delivery approaches that may make use of sophisticated electrical and electronic laboratory equipment and/or on-line delivery and/or Virtual Learning Environments to enhance candidate learning. By their very nature Engineering courses require the transfer of technical knowledge and skills from one area to another. For example, a significant level of Aircraft Engineering Principles and Mathematics has been included in the HND Aircraft Engineering awards because these subjects provide underpinning knowledge, understanding and skills which are used elsewhere in both awards. Candidates will also have an opportunity to use the communication and information technology knowledge and skills developed in the mandatory and optional Units in other parts of the awards to support such activities as report writing, presentation and the application of specialist software packages. Core Skills in general, and Problem Solving in particular, have been regarded as very important by the Qualification Design Team since it is recognised that a good level of competence in these is essential in the work of an Aircraft technician.
19	The 2 HN credit (16 SCQF points) Aircraft Engineering Project Graded Unit in the HND Aircraft Engineering qualification provides opportunities for candidates to develop both their planning and project management knowledge and skills.
20	An HND in Aircraft Engineering has been recognised for many years by employers and other stakeholders of these awards as an appropriate qualification for persons wishing to work at technician or senior technician levels. Market research indicates that there is a growing demand for people with technician level skills in Aircraft engineering especially as companies within the industries are expected to expand in the coming years. Thus, it is confidently anticipated that those achieving the HNC and HND Aircraft Engineering awards will have opportunities to find employment as technicians and senior technicians in a wide range of small, medium and large aircraft engineering organisations.
21	As indicated in Appendix B market research shows that employers place a high priority on employees having the correct technical and practical skills to function effectively in their job. Whilst there continues to be a debate about the precise nature of such technical and practical skills it is clearly important that Aircraft engineering technicians have a sound knowledge and understanding of core aviation principles. Such knowledge and understanding will serve candidates well in employment and provide the platform for learning more advanced technical skills.
22	The Qualification Design Team have adopted the Units *Mathematics for Engineering 2* (mandatory) and *Mathematics for Engineering 3* (optional)

Aim No.	How it is met in HND
23	The mandatory/restricted core sections of the HND Aircraft Engineering Group Award contain all the Units in the Mandatory/Restricted Core sections of the HNC Aircraft Engineering Group Award. In addition, within the P/T section of the HND Aircraft Engineering awards there are Units which allow candidates to expand their knowledge, understanding and skills along study routes that can be specifically tailored to suit entry or progression within the aircraft manufacturing or maintenance industries with either an airframes/engines or avionics bias. The Qualification Design Team has also considered it important to build on the mathematical skills developed in the *Mathematics and Physics for Aviation* Unit: by including 2 Mathematics Units (entitled *Mathematics for Engineering 2* (mandatory) and *Mathematics for Engineering 3* (optional)) within the HND Group Award. The main subject area of this Unit is Calculus.

Appendix 2: Core Skills development opportunities within HND Aircraft Engineering Units

Note: 1 Units are listed in the same order as presented within the award framework specification

Note 2 CT = Critical Thinking; P & O = Planning & Organisation; R & E = Reviewing & Evaluating

Note 3 5* or 6* indicates separate certification; otherwise the Core Skills levels are merely sign-posted at the highest opportunity

Unit title	**Communication**			**Numeracy**		**Information Technology**	**Problem Solving**			**Working with Others**
	Read	**Write**	**Oral**	**Using Number**	**Using Graph Inform.**	**Using Information Technology**	**CT**	**P & O**	**R & E**	**Working with Others**
Communication: Practical Skills	6*	6*	6*							6
Mathematics and Physics for Aviation				6	6		6	5	6	
Aerodynamics		6		6	6		6	5	6	
Aircraft Structures and Materials	6	6			6		6	5	6	
Aircraft Propulsion Systems: Introduction	6	6					6	5	6	
Mathematics for Engineering 2				6	6		5	5	5	
Human Factors for Aircraft Engineering	6	6					6	6	6	
Aircraft Engineering: Graded Unit 1	5	5		5	5		5		5	
Aircraft Engineering: Graded Unit 2	6	6	6	6	6	6	5* (6)	5* (6)	5* (6)	6

Unit title	Communication			Numeracy		Information Technology	Problem Solving			Working with Others
	Read	Write	Oral	Using Number	Using Graph Inform.	Using Information Technology	CT	P & O	R & E	Working with Others
Aircraft Electrical Power Systems	6	6		5	5		5	5	5	
Aircraft Electronic Techniques	6	6		5	5		5	5	5	
Aircraft Servo Control Systems	6	6					6	5	6	
Aircraft Automatic Flight and Landing Systems	6	6					6	5	6	
Radio and Radar Principles for Aviation	6	6		6	6		6	5		
Aircraft: Environmental Systems: Cabin Conditioning and Pressurisation	6	6					6	5	6	
Aircraft: Landing Gear	6	6			5		6	5	6	
Aircraft: Inspection and Repair	6	6			5		5	5	5	5
Communication and Navigation Systems for Aviation	6	6			6		6	5	6	
Aircraft Gas Turbine Engines	6	6			6		6	5	6	
Computer Aided Engineering and Prototyping	6	6			6	6	6	6	6	

Unit title	Communication			Numeracy		Information Technology	Problem Solving			Working with Others
	Read	Write	Oral	Using Number	Using Graph Inform.	Using Information Technology	CT	P & O	R & E	Working with Others
Electronic Fundamentals for Aviation		6		6	6	5	6	5	6	
Electrical Fundamentals for Aviation		6		6	6		6	5	6	
Engineering Principles				6	6		6	5	6	
Practical Aircraft Skills	6						6	6	6	6
Aircraft Electrical and Electronic Skills	6						6	6	6	6
Aircraft Maintenance Skills	6						6	6	6	6
Engineering Skills	6	6					6	6	6	6
Aircraft Systems: Flight Controls	6	6					6	5	6	
Aircraft Propellers	6	6					6	5	6	
IT: Applications Software 1	5	5				6*				

Unit title	Communication			Numeracy		Information Technology	Problem Solving			Working with Others
	Read	Write	Oral	Using Number	Using Graph Inform.	Using Information Technology	CT	P & O	R & E	Working with Others
Aircraft Hydraulic and Pneumatic Systems	6	6		6	6	5	6	5	6	
Avionics	6	6			6		6		6	
Aircraft Instruments	6	6			6		6		6	
Materials Selection	6	6			6		6		6	
Engineering Drawing	6	6			6					
Computer Aided Draughting for Engineering	6	6			6	6				
Design for Manufacture	6	6		6	6		6	5	6	6
Statics and Strength of Materials				6	6		6	5	6	
Dynamics				6	6		6	5	6	

Unit title	Communication			Numeracy		Information Technology	Problem Solving			Working with Others
	Read	Write	Oral	Using Number	Using Graph Inform.	Using Information Technology	CT	P & O	R & E	Working with Others
Heat Transfer and Fluid Mechanics		6		6	6		6	5	6	
Thermofluids		6		6	6		6	5	6	
Aviation Legislation	6	6								
Employment Experience 2	6	6					6	6	6	6
Business Awareness and Continuing Professional Development	6	6	6			6	6	6	6	6
Mathematics for Engineering 3				6	6		5	5	5	
CNC						6	6	6	6	
Computer Aided Manufacture						6	6	6	6	

Appendix 3: HNC and HND Content Links to National Occupational Standards

A3.1 Relevant Aircraft Engineering National Occupational Standards contextualised by SEMTA

Occupational area	Reference number	SEMTA AIRCRAFT ENGINEERING NOS TITLE
Basic Processes	1	Marking Out Aircraft Components
	2	Reinstating Work Areas on Completion of Aircraft Engineering Activities
Airframe Manufacture, Assembly, Maintenance and Testing	3	Cutting and Shaping Aircraft Components
	4	Bending and Forming Aircraft Components
	5	Producing Aircraft Major Assemblies
	6	Producing Aircraft Detail Assemblies
	7	Producing Aircraft Sub-Assemblies
	8	Carry Out Aircraft Detail Fitting Activities
	9	Installing Aircraft Mechanical Fasteners
	10	Aircraft Airframe Mechanical Components and Systems
Aircraft Systems: Installing; Removing & Replacement; Maintenance and Testing	11	Aircraft Engines and Systems
	12	Aircraft Fuel and Lubrication Systems
	13	Aircraft Electrical Equipment
	14	Aircraft Electrical Power Control, Distribution and Protection Systems
	15	Aircraft Pneumatic and Vacuum Systems
	16	Aircraft Hydraulic Systems
	17	Aircraft Environmental Systems
	18	Aircraft Control Systems
	19	Aircraft Flight Guidance and Control Systems
	20	Aircraft Communication Systems
	21	Aircraft Radar Systems
	22	Aircraft Navigational & Computer Systems
	23	Avionic Indication and Gauging Components in Aircraft Systems
	24	Aircraft Pitot Static Systems

A3.2(1) Mapping of HNC and HND Units to Relevant National Occupational Standards

Unit code	Unit title	SEMTA NOS Reference Number – Basic Processes & Airframe											
		1	2	3	4	5	6	7	8	9	10	11	12
DP5P 34	Aircraft Structures and Materials			3	3	3	3	3	3	3	3		
DT46 34	Materials Selection			3	3	3	3	3	3	3	3	3	3
DR1W 34	Engineering Drawing	3		3	3	3	3	3	3	3	3		
DP5R 33	Practical Aircraft Skills	3	3	3	3	3	3	3	3	3	3		
DR0D 33	Aircraft Electrical and Electronic Skills	3	3	3	3	3	3	3	3	3			
DR1V 34	Engineering Skills	3	3	3	3	3	3	3	3	3	3		
DT5P 34	CNC	3		3	3	3						3	3
D4FX 34	Computer Aided Manufacture	3		3	3	3						3	3
F0M8 35	Aircraft: Landing Gear										3		
DR09 34	Aircraft Propulsion Systems: Introduction											3	3
F0M6 35	Aircraft Gas Turbine Engines											3	3
DP5L 33	Aircraft Maintenance Skills	3	3	3	3	3	3	3	3	3	3	3	3
F0M7 35	Aircraft: Inspection and Repair	3	3	3	3	3	3	3	3	3	3	3	3

A3.2(2) Mapping of HNC and HND Units to Relevant National Occupational Standards

Unit code	Unit title	SEMTA NOS Reference Number – Aircraft Systems											
		13	14	15	16	17	18	19	20	21	22	23	24
F0YB 35	Aircraft Electrical Power Systems	3	3										
F0M4 35	Aircraft Electronic Techniques												
DR03 34	Aircraft Systems: Flight Controls						3						
DR05 34	Avionics											3	
DP5M 34	Aircraft Instruments											3	3
DR02 34	Aircraft Hydraulic and Pneumatic Systems			3	3								
F0M1 35	Aircraft Servo Control Systems						3						
F0M2 35	Aircraft Automatic Flight and Landing Systems							3					
F0M9 35	Radio and Radar Principles for Aviation									3			
F0M3 35	Communication and Navigation Systems for Aviation								3		3		
F0M5 35	Aircraft: Environmental Systems: Cabin Conditioning and Pressurisation					3							
DP5L 33	Aircraft Maintenance Skills	3	3	3	3		3						3
F0M7 35	Aircraft: Inspection and Repair	3	3	3	3	3	3	3	3	3	3	3	3

Appendix 4: Credit transfer opportunities from HNC Engineering: Aeronautical (G0E3 15)

Old Unit			New Unit			Credit transfer status
Number	**Title**	**Credit**	**Number**	**Title**	**Credit**	
A6AN 04	IT Applications 2	1	D75X 34	Information Technology: Applications Software 1	1	Full
D5P3 04	Communication: Presenting Complex Communications for Vocational Purposes	1	D77G 34	Communication: Practical Skills	1	Partial
BA24 34	Fundamentals of Quality Assurance	1		No equivalent in the framework		Nil
D4H7 04	Engineering Project	2	F1FX 35	Graded Unit must be undertaken	2	Nil
	No single Unit full equivalent		DG4L 34	Mathematics for Engineering 2	1	Recommend complete new Unit
D4JF 04	Materials Selection and Test	1	DT46 34	Engineering Materials Aircraft Structure and Materials	1 2	Full Partial
D4H6 04	Engineering Business Studies	1		No equivalent in framework		Nil
D4H4 04	Electronic Construction Skills	1	DR0D 33	Aircraft Electrical & Electronic Skills	1	Recommend completes skills assessment to new Unit criteria in an aircraft context
D4H2 04	Electronic Testing Skills	1				
D4GR 04	Electrical Installation & Commissioning Skills	1				
D4FV 04	Component Manufacturing Skills	1	DP5R 33 OR DR1V 34	Practical Aircraft Skills OR Engineering Skills	1 1	
D4KT 04	Product Assembly Skills	1				
D4KV 04	Product Manufacturing Skills	1				
A58T 04	Aircraft Propulsion Systems: General	1	DR09 34	Aircraft Propulsion Systems: Introduction	1	Full
D54D 04	Aircraft Structures: General	1	DP5P 34	Aircraft Structures and Materials	2	Partial
D54G 04	Aircraft Aerodynamics: General	1	DR0C 34	Aerodynamics	1	Full
D5X4 04	Avionics	1	DR05 34	Avionics	1	Full
D5XA 04	Aviation Legislation	1	DR04 34	Aviation Legislation	1	Full
D54F 04	Aircraft Electrical Power Systems: General	1	F0YB 35	Aircraft Electrical Power Systems	1	Full
D5X1 04	Aircraft Structures: Advanced	1		No equivalent		Nil

Old Unit			New Unit			Credit transfer status
Number	**Title**	**Credit**	**Number**	**Title**	**Credit**	
D5X2 04	Aircraft Aerodynamic Performance	1		No equivalent		Nil
D5X3 04	Aircraft Propulsion Systems: Advanced	2	F0M6 35	Aircraft Gas Turbine Engines	2	Partial
D5X5 04	Aircraft Systems: Flight Control	1	DR03 34	Aircraft Systems: Flight Control	1	Full
D5X7 05	Aircraft Maintenance Processes	1		No equivalent		Nil
D5X8 04	Aircraft Systems: Landing Gear	1	F0M8 35	Aircraft: Landing Gear	1	Full
D5X9 04	Aircraft Systems: Advanced Hydraulics & Pneumatics	1	DR02 34	Aircraft Hydraulic and Pneumatic Systems	1	Full
D4KN 04	Principles of Transformers & Motors	0.5		No equivalent in framework		Nil
D4GB 04	DC Motors	0.5		No equivalent in framework		Nil
D4JL 04	Mechanical Engineering Principles: Statics & Dynamics	1	DR3L 34 DT9T 34	Engineering Principles Dynamics	1 1	Partial Partial
D4JM 04	Mechanical Engineering Principles: Thermofluids	1	DT9P 34	Thermofluids	1	Full
D4LM 04	Transducers	0.5		No equivalent in framework		Nil
D4G5 04	Control Fundamentals	0.5		No equivalent in framework		Nil
D4GD 04	Design Drawing & Communication for Engineers	1	DR1W 34	Engineering Drawing	1	Full
D4FW 04	Computer Aided Draughting	1	DR1X 34	Computer Aided Draughting for Engineers	1	Full
D4GE 04	Design for Manufacture	1	DR3M 34	Design for Manufacture	1	Full
D4HW 04	Heat Transfer & Fluid Mechanics	1	DT5T 35	Heat Transfer and Fluid Mechanics	1	Full
D4HB 04	Engineering Mechanics & Strength of Materials: General	1	DR1T 34	Statics and Strength of Materials	1	Partial
D4FP 04	CNC Machining	1	DT5P 34	CNC	1	Full
D4FY 04	Computer Aided Draughting & Manufacture		D4FX 34	Computer Aided Manufacture	1	Full
	No single Unit full equivalent		DG4P 35	Mathematics for Engineering 3	1	Recommend complete new Unit

Appendix 5: Suggested sequence of full-time delivery of Units to achieve the HNC and the HND Aircraft Engineering

1 **Year 1 —** Common programme for all specialisations to achieve HNC Aircraft Engineering.

Unit title	Unit code	SQA credit	Block	Semester
Communication: Practical Skills	D77G 34	1	1	1
Mathematics & Physics for Aviation	DR0A 33	2	1	1
Aircraft Structures & Materials	DP5P 34	2	1 and 2	1
Practical Aircraft Skills	DP5R 33	1	1	1
Aerodynamics	DR0C 34	1	2	1
Aircraft Propulsion Systems: Introduction	DR09 34	1	2	1
Electrical Fundamentals for Aviation	DR06 34	1	2	2
Aircraft Electrical & Electronic Skills	DR0D 33	1	2 and 3	2
Electronic Fundamentals for Aviation	DR07 34	1	3	2
Aircraft Hydraulic & Pneumatic Systems	DR02 34	1	3	2
Aircraft Systems: Flight Control	DR03 34	1	3	2
Computer Aided Draughting	DR1X 34	1	3	2
Graded Unit 1	DR01 34	1	3	2

2 **Year 2 —** HND: Airframe and Engines Specialisation

Unit title	Unit code	SQA credit	Block	Semester
Mathematics for Engineering 2	DG4L 34	1	1	1
Aircraft Electrical Power Systems	F0YB 35	1	1	1
Aircraft Gas Turbine Engines	F0M6 35	2	1 and 2	1
Engineering Principles	DR32 34	1	1	1
Aircraft Maintenance Skills	F0M8 35	1	1	1
Aircraft Landing Gear	DP5L 33	1	2	1
Aircraft Inspection & Repair	F0M7 35	1	2	2
Aircraft Environmental Systems	F0M5 35	1	2	2
Aircraft Servo Control Systems	F0M1 35	1	3	2
Aircraft Instruments	DP5M 34	1	3	2
Aviation Legislation	DR04 34	1	3	2
Human Factors for Aircraft Engineering	DR08 34	1	3	2
Graded Unit 2	F1FX 35	2	2 and 3	2

3 **Year 2 —** HND: Avionics Specialisation

Unit title	Unit code	SQA credit	Block	Semester
Mathematics for Engineering 2	DG4L 34	1	1	1
Aircraft Electrical Power Systems	F0YB 35	1	1	1
Aircraft Electronic Techniques	F0M4 35	1	1	1
Aircraft Inspection & Repair	F0M7 35	1	1	1
Aircraft Instruments	DP5M 34	1	1	1
Radio & Radar Principles for Aviation	F0M9 35	2	2	1
Communication & Navigation Systems for Aviation	F0M3 35	2	2	2
Aircraft Automatic Flight & Landing Systems	F0M2 35	1	2	2
Mathematics for Engineering 3	D4GP 35	2	3	2
Human Factors for Aircraft Engineering	DR08 34	1	3	2
Graded Unit 2	F1FX 35	2	2 and 3	2

4 **Year 2 —** HND: Design & Manufacturing Specialisation

Unit title	Unit code	SQA credit	Block	Semester
Mathematics for Engineering 2	DG4L 34	1	1	1
Aircraft Electrical Power Systems	F0YB 35	1	1	1
Engineering Principles	DR32 34	1	1	1
CNC	DT5P 34	1	1	1
CAE & Prototyping	DR1R 35	2	1 and 2	1
Aircraft Servo Control Systems	F0M1 35	1	2	1
Aircraft Inspection & Repair	F0M7 35	1	2	2
Design for Manufacture	DR3M 35	1	2	2
Mathematics for Engineering 3	D4GP 35	2	3	2
Heat Transfer & Fluid Mechanics	DT5T 35	1	3	2
Human Factors for Aircraft Engineering	DR08 34	1	3	2
Graded Unit 2	F1FX 35	2	2 and 3	2