Higher National Graded Unit specification

General information for centres

This Graded Unit has been validated as part of the HND CADD. Centres are required to develop the assessment instrument in accordance with this validated specification. Centres wishing to use another type of Graded Unit or assessment instrument are required to submit proposals detailing the justification for change for validation.

Graded Unit title: Computer Aided Draughting and Design: Graded Unit 2

Graded Unit code: F328 35

Type of Graded Unit: Project

Assessment Instrument: Practical Assignment

Credit points and level: 2 HN credits at SCQF level 8: (16 SCQF credit points at SCQF level 8*)

**SCQF credit points are used to allocate credit to qualifications in the Scottish Credit and Qualifications Framework (SCQF). Each qualification in the Framework is allocated a number of SCQF credit points at an SCQF level. There are 12 SCQF levels, ranging from Access 1 to Doctorates.*

Purpose: This Graded Unit is designed to provide evidence that the candidate has achieved the following principal aims of the HND Computer Aided Draughting and Design:

- develop key skills for employability while building on previously acquired transferable skills enabling progression within the SCQF (Scottish Credit and Qualification Framework) or lead to employment in a range of disciplines such as Engineering design/manufacture, Architectural design/ detailing, Product design, Furniture design, Interior design, Landscape design, Sign design, Jewellery design and Civil / Structural design, etc
- provide an award that enables candidates to achieve appropriate professional body recognition
- provide candidates with a range of contemporary vocational skills including the preparation, co-ordination and communication of technical information including drawings, graphical information, reports and schedules, contributing to meeting relevant statutory regulations and controlling projects by monitoring agreed standards and obtaining, recording and organising information
- develop knowledge, understanding and skills in a range of core Computer Aided Draughting topics at SCQF level 8
- develop a degree of specialisation within subject specific disciplines

General information for centres (cont)

Recommended prior knowledge and skills: It is recommended that the candidate should have completed or be in the process of completing the following Units relating to the above specific aims prior to undertaking this Graded Unit:

F218 35	CAD: Manufacturing
F217 35	CAD: Feature Based Modelling 2
F219 35	CAD: Prototyping
F214 35	CAD: 3D Animation
D76J 35	Project Management

Additionally, it would be of benefit to acquire specialist skills by completing a range of Units from the HND Computer Aided Draughting and Design Optional Units.

Core Skills: There are opportunities to develop the Core Skills in this Unit, although there is no automatic certification of Core Skills or Core Skills components. Further detail is articulated below.

The Graded Unit gives further opportunities to broaden and develop a range of Core Skills especially that of Problem Solving. The Core Skills of Numeracy, Problem Solving, Information Technology and Communication, may all be developed to SCQF level 6. These Core Skills are utilised to plan develop and evaluate this practical assignment project.

Assessment: This Graded Unit will be assessed by the use of practical assignment (CAD project). The developed assignment should provide the candidate with the opportunity to produce evidence that demonstrates she/he has met the aims of the Graded Unit that it covers.

Administrative Information

Graded Unit code: F328 35

Graded Unit title: Computer Aided Draughting and Design: Graded Unit 2

Original date of publication: February 2008

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History of changes:

Version	Description of change	Date

Source: SQA

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

Additional copies of this Graded Unit specification if sourced by the Scottish Qualifications Authority can be purchased from the Scottish Qualifications Authority. Please contact the Customer Contact Centre for further details, telephone 0845 279 1000.

Higher National Graded Unit specification: instructions for designing the assessment task and assessing candidates

Graded Unit title: Computer Aided Draughting and Design: Graded Unit 2

Conditions of assessment

The candidate should be given a date for completion of the practical assignment**.** However, the instructions for the assessment task should be distributed to allow the candidate sufficient time to assimilate the details and carry out the assessment task. During the time between the distribution of the assessment task instructions and the completion date, assessors may answer questions, provide clarification, guidance and reasonable assistance. The assessment task should be marked as soon as possible after the completion date. The final grading given should reflect the quality of the candidate's evidence at the time of the completion date.

The evidence for the project is generated over time and involves three distinct stages, where each stage has to be achieved before the next is undertaken. Thus any re-assessment of stages must be undertaken before proceeding to the next stage.

If a candidate fails the project overall or wishes to upgrade, then this must be done using a *substantially different* project, ie all stages are undertaken using a new project, assignment, case study, etc. In this case, a candidate's grade will be based on the achievement in the re-assessment, if this results in a higher grade.

At this level, candidates should work independently within the context of a typical working environment. Centres should encourage candidates to bring their specialist knowledge and experience to the project. Candidates should be allowed to use appropriate technology within and outwith the college environment.

To ensure authentication of work, candidates must complete a log diary recording progress and tasks completed. There should be regular meetings between the tutor and candidate(s) to review progress and these meetings should be recorded.

The final evaluation should include questioning of each candidates understanding of the evidence submitted. Where possible, the involvement of an employer in the questioning is encouraged.

Instructions for designing the assessment task

The assessment task is a project. The project undertaken by the candidate must be a complex task which involves:

- variables which are complex or unfamiliar
- relationships which need to be clarified
- a context which may be familiar or unfamiliar to the candidate

Higher National Graded Unit specification: instructions for designing the assessment task and assessing candidates (cont)

Graded Unit title: Computer Aided Draughting and Design: Graded Unit 2

The assessment task must require the candidate to:

- respond to a design brief which contains a scenario which reflects contemporary industrial, commercial or private working policies and procedures
- analyse the task and decide on a course of action for undertaking the project
- take forward a concept and develop this into a practical output in the form of a series of illustrative evidence and at least one physical model
- plan and organise work in the form of an action plan document and carry it through to completion producing a log book of progress with a minimum of six sequential entries
- reflect on what has been done during three feedback sessions with the Graded Unit mentor and draw conclusions for the future in the evaluation evidence produced
- produce evidence of meeting the aims in a project report which this Graded Unit has been designed to cover

Some ideas for possible design briefs are contained in the support notes for this Graded Unit.

Higher National Graded Unit specification: instructions for designing the assessment task and assessing candidates (cont)

Guidance on grading candidates

Candidates who meet the minimum Evidence Requirements will have their achievement graded as C — competent, or A — highly competent or B somewhere between A and C. The grade related criteria to be used to judge candidate performance for this Graded Unit is specified in the following table.

Grade A	Grade C
Is a seamless, coherent piece of work which:	Is a co-ordinated piece of work which:
♦ Accurately details the project objectives and fully reflects the key long term project targets and goals in a consistent and fully comprehensive manner.	♦ Identifies the project objectives and long term project targets.
♦ Identifies a primary and secondary target market.	♦ Identifies a target market.
♦ Details carefully selected information from a variety of sources to provide strong and valid reasons to support points made.	♦ Details an adequate knowledge base from a limited range of sources to support the demands of the project.
♦ Contains a project schedule detailing a comprehensive list of project activities and timings. The information in the initial schedule is used to assess if the project can be completed within timescales. The schedule is monitored on a regular basis to inform on-going project planning and development.	♦ Contains a project schedule detailing all essential project activities and timings. Provides evidence that the schedule has been monitored on at least three separate occasions during the life of the Project.
♦ Details a comprehensive verification strategy, developed to ensure the product is completely tested.	♦ Details a verification strategy, developed to test any essential parts of the product.
♦ Makes use of concept development methods to communicate a comprehensive understanding of detail design considerations including materials, manufacturing processes and costs.	♦ Makes use of concept development methods to communicate design considerations including materials, manufacturing processes and costs.
♦ Summarises concept development, detailing a minimum of three concepts supported by a comprehensive evaluation of the strengths and weaknesses of each design.	♦ Summarises a minimum of three concepts developments
♦ Determines solutions through evaluation methods, supported by a rationale and justification.	♦ Presents solutions.

Higher National Graded Unit specification: instructions for designing the assessment task and assessing candidates (cont)

Grade A	Grade C
♦ Detailed prototype is created with notes.	♦ Contains a simple prototype.
♦ Contains comprehensive manufacturing drawings.	♦ Contains manufacturing drawings for the key elements of the design.
♦ Makes use of animation tools in the creation of a comprehensive animated sequence that incorporates both camera and component animation.	♦ Makes use of animation tools in the creation of an animated sequence.
♦ Contains supporting graphics produced to a presentation standard.	♦ Contains supporting graphics.
♦ Evidences candidate feed back to her/his supervisor on a regular basis. As well as updating the supervisor on progress made and actions for the next stage of the project.	♦ Evidences candidate feed back to her/his supervisor on at least three occasions.
♦ Contains only relevant, well structured Information. Has clear and accurate conclusions and recommendations and uses language of high standard in terms of accuracy and technical content.	♦ Contains a structured report with conclusions and recommendations.
♦ Contains the log book, regularly maintained and providing a detailed, informal record of the candidate's thinking as the project develops including reflective comments.	♦ Contains the log book containing project ideas and progress and there is evidence that entries have been made on at least six occasions during the life of the project.
♦ Demonstrates clear, explicit links between the three stages of the investigation.	♦ Demonstrates links between the three stages of the investigation.
♦ The candidate gives clear, concise and technically accurate answers to questions raised during the presentation.	♦ The candidate answers questions raised as part of the presentation.
♦ The candidate identifies clear and full details of the new knowledge and skills he/she has developed as a result of doing the project.	♦ The candidate identifies some details of the new knowledge and skills he/ she has developed as a result of undertaking the project.
♦ Demonstrates self directed learning consistently.	♦ Seeks additional mentor support.
♦ Details additional research undertaken to enhance discussion and solutions provided.	♦ Some research included.

Higher National Graded Unit specification: instructions for designing the assessment task and assessing candidates (cont)

The project will be marked out of 100. Assessors will mark each stage of the project, taking into account the criteria outlined. The marks will then be aggregated to arrive at an overall mark for the project. Assessors will then assign an overall grade to the candidate for this Graded Unit based on the following grade boundaries.

A = 70% — 100%
B = 60% — 69%
C = 50% — 59%

Note: the candidate must achieve all of the minimum evidence specified below for each stage of the project in order to achieve the Graded Unit.

Higher National Graded Unit specification: instructions for designing the assessment task and assessing candidates (cont)

Evidence Requirements

The project consists of three stages: planning; developing; and evaluating. The following table specifies the minimum evidence required to pass each stage.

Note: The candidate must achieve **all of the minimum evidence** specified below for each stage of the project in order to pass the Graded Unit.

Project stage	Minimum Evidence Requirements
Stage 1 — Planning 30%	Action plan document which includes: ♦ A set of objectives relating to a given design brief ♦ Development of project plan ♦ Identification of the market ♦ Information gathered from a variety of sources to support concepts ♦ Aims of the practical assignment with clearly defined goals and targets ♦ Identification of materials and resources required and how they will be accessed ♦ Verification strategy is established with a minimum of three candidate/mentor feedback sessions *The candidate must achieve all of the minimum evidence specified above in order to pass the Planning stage.*
Stage 2 — Developing 50%	Produce a project report: ♦ Concept development methods are used to identify materials, manufacturing processes, sizes and costs. ♦ Evaluation methods are applied to determine solution selection ♦ Report on concept development phase ♦ Produce log book with a minimum of six entries Practical output: ♦ Concept sketches ♦ Creation of prototype ♦ Production of manufacturing drawings ♦ 3D Animation ♦ Presentation graphics ♦ Attends three feedback sessions with mentor ♦ Demonstrates self-directed learning throughout the project *The candidate must achieve all of the minimum evidence specified above in order to pass the Developing stage.*

Higher National Graded Unit specification: instructions for designing the assessment task and assessing candidates (cont)

Project stage	Minimum Evidence Requirements
Stage 3 — Evaluating 20%	♦ Review and update the project plan as the project progresses ♦ Progress report and goal setting as part of the project implementation ♦ Identification of knowledge and skills which have been gained by the candidate ♦ Summary of any unforeseen events and methods employed to overcome them ♦ Assess the strengths and weaknesses of the output of the assignment ♦ Determine to what extent the assignment met the original brief ♦ Responds to questions based upon the content of the project submission ♦ List three action points if you were to undertake a similar project again *The candidate must achieve all of the minimum evidence specified above in order to pass the Evaluating stage.*

Support notes

This project for the HND CADD takes forward a concept, and develops this into a practical output in the form of a series of illustrative and physical models in response to a design brief. Candidates are given the opportunity to develop the concept drawing on their own vocational and personal interests. Candidates may present evidence selected from a range of illustrative techniques which may include: Sketches, 2D and 3D CAD output as well as mixed media time based material. A physical model will be produced supporting all of the previous development work as demonstrable physical solution to the design scenario.

The candidate could be introduced to the Graded Unit at the start of the academic year and Course tutors could be encouraged to refer to any contributory information, tasks and details which may be useful when the actual Graded Unit is undertaken. Every opportunity should be taken prior to embarking on the Graded Unit to encourage candidates to develop independent learning skills, producing to timelines and obtaining sufficient research documentation to support ideas generation. This will provide opportunities for the candidate within a supportive environment to develop an appreciation of project management techniques. Such formative tasks will prepare candidates to undertake a project-based assignment.

Possible design briefs could be structured around architectural, engineering, interior design, product design, landscaping or other design related projects.

Such an approach is intended to reflect contemporary industrial, commercial and private working practices and procedures.

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 assessment arrangements. For information on these, please refer to the SQA document *Guidance on Assessment Arrangements for Candidates with Disabilities and/or Additional Support Needs*, which is available on SQA's website: **www.sqa.org.uk**.

General information for candidates

This Graded Unit is designed to provide you with opportunities to demonstrate acquisition of knowledge and skills which reflect and underpin the principal aims of the HND Computer Aided Draughting and Design award.

Essentially the assessments are designed to provide evidence that you have developed key skills for employability and built on acquired transferable skills you have obtained over the second year of your Course. These skills include research and analysis, defining and problem solving, while taking responsibility for your own learning. The Graded Unit requires you to demonstrate planning, organisational and evaluation skills and a broadening and deepening of the technical skills required to work to a given design brief. You will also be required to demonstrate communication skills and resource management ability.

The practical assignment used in this Graded Unit has also been chosen to develop a range of Communication and Information Technology skills relevant to CAD technicians/draughtspersons. Being a project it will also demand problem solving and analytical skills as you progress through the tasks in the Graded Unit, which culminates in the production of a physical solution to the design brief.

The scope of the design brief will allow you a degree of personal choice, reflecting your own personal or vocational interests in finding solutions which match the design requirements. Such an approach is intended to reflect contemporary industrial, commercial and private working practices and procedures.