

BTEC

Edexcel Level 5 BTEC Higher Nationals in 3D Design

March 2005

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Guidance and units

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EDEXCEL LEVEL 5 BTEC HIGHER NATIONALS IN 3D DESIGN

BTEC Higher National Certificate in 3D Design

BTEC Higher National Diploma in 3D Design

The Qualifications Curriculum Authority (QCA) has introduced changes to the National Qualifications Framework (NQF) in the way it sets out the levels at which qualifications are recognised. Its revised levels broadly compare with the Framework for Higher Education Qualifications (FHEQ). The academic level of BTEC Higher National Certificates and Diplomas has not changed and they will remain as Intermediate level qualifications on the FHEQ. However, the QCA changes will allow the NQF to recognise more precisely the true academic level of BTEC Higher Nationals and they will now be designated at the revised NQF Level 5. As the academic level has not changed, progression to BTEC Higher Nationals will still be from Level 3 qualifications and progression from BTEC Higher Nationals will be to qualifications at the revised Level 6. Learners' progression routes do not necessarily involve qualifications at every level.

Specifications for all new accreditations after September 2004 will show both the original and revised NQF levels and the QCA Openquals database (www.qca.org.uk/openquals) will show both the original level and the revised level for each of these qualifications. Certification will be at the original levels up until December 2005. All certifications after that date will be at the revised levels.

Further information on these changes can be obtained from QCA at www.qca.org.uk/qualifications/types/7918.html

BTEC Higher Nationals within the National Qualifications Framework (NQF)

NQF	
Original levels	Revised levels #
5 Level 5 BTEC Advanced Professional Diplomas, Certificates and Awards	8 No current BTEC qualifications
	7 Level 7 BTEC Advanced Professional Diplomas, Certificates and Awards
4 Level 4 BTEC Higher National Diplomas and Certificates Level 4 BTEC Professional Diplomas, Certificates and Awards	6 No current BTEC qualifications
	5 Level 5 BTEC Higher National Diplomas and Certificates Level 5 BTEC Professional Diplomas, Certificates and Awards
	4 Level 4 BTEC Professional Diplomas, Certificates and Awards
3 <i>There is no change to Level 3 in the revised NQF</i> Level 3 BTEC National Diplomas, Certificates and Awards Level 3 BTEC Diplomas, Certificates and Awards Advanced GCE	
2 <i>There is no change to Level 2 in the revised NQF</i> Level 2 BTEC First Diplomas and Certificates Level 2 BTEC Diplomas, Certificates and Awards GCSEs grades A*-C	
1 <i>There is no change to Level 1 in the revised NQF</i> Level 1 BTEC Introductory Diplomas and Certificates Level 1 BTEC Diplomas, Certificates and Awards GCSEs grades D-G	
Entry <i>There is no change to Entry Level in the revised NQF</i> Entry Level BTEC Certificates in Skills for Working Life and Life Skills	

Framework for Higher Education Qualifications (FHEQ)
D (doctoral) doctorates
M (masters) masters degrees, postgraduate certificates and diplomas
H (honours) bachelors degrees, graduate certificates and diplomas
I (intermediate) diplomas of higher education and further education, foundation degrees, higher national diplomas
C (certificate) certificates of higher education

The revised NQF applies from 1 September 2004 and will be fully implemented from 1 January 2006.

The revision is designed to recognise more precisely the academic levels at the higher levels of the framework: the actual content and other attributes of the respective qualifications are not altered or diminished.

The revision also provides better alignment with the FHEQ used in universities and higher education institutions.

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Qualification titles covered by this specification

Edexcel Level 5 BTEC Higher National Certificate in 3D Design

Edexcel Level 5 BTEC Higher National Diploma in 3D Design

These qualifications have been accredited to the National Qualifications Framework (NQF). The Qualification Accreditation Numbers (QANs) for these qualifications are listed in *Annex A*.

These qualification titles are as they will appear on the learner's certificate. Learners need to be made aware of this when they are recruited by the centre and registered with Edexcel. Providing this happens, centres are able to describe the programme of study leading to the award of the qualification in different ways to suit the medium and the target audience.

Introduction

This document contains the units and associated guidance for the National Qualifications Framework (NQF) Edexcel Level 5 BTEC Higher Nationals in 3D Design. Each unit sets out the required outcomes and content and includes advice regarding appropriate delivery and assessment strategies. The guidance contains further details of the teaching, learning, assessment and quality assurance of these qualifications. It includes advice about Edexcel's policy regarding access to its qualifications, the design of programmes of study and delivery modes.

Structure of the qualification

BTEC Higher National Certificate

The BTEC Higher National Certificate in 3D Design is a 10-unit qualification of which seven are core units.

The BTEC Higher National Certificate programme must contain a minimum of five units designated at H2 level.

BTEC Higher National Diploma

The BTEC Higher National Diploma in 3D Design is a 16-unit qualification of which seven are core units.

The BTEC Higher National Diploma programme must contain a minimum of eight units designated at H2 level.

Structure of Edexcel Level 5 BTEC Higher National Certificate in 3D Design

Unit No	Core units — all seven units must be taken	Unit level H1 or H2
1	Drawing Techniques and Approaches	H1
2	Historical and Contextual Referencing	H1
3	Properties of 3D Materials	H1
4	3D Technology and Processes	H1
5	Critical Study	H2
6	Professional Practice and Development	H2
7	Professional Studies	H2
	Specialist units — choose three units	
8	Design Method	H1
9	Computer Applications in Art and Design	H1
10	Design Principles	H1
11	3D Animated Products	H1
12	Product Design	H1
13	Commercial Model Making	H2
14	Furniture Design	H2
15	Design for Performance	H2
16	Specialist 3D Materials	H2
17	Specialist 3D Technology and Processes	H2
18	Design and Function	H1
19	Visual and Personal Presentation	H1
20	Marketing	H1
21	Ceramics	H2
22	Jewellery, Accessories and Body Adornment	H2
23	Light Metals	H2
24	Wood	H2
25	Glass	H2
26	Exhibition and Retail Design	H2
27	Interior Design	H2

The BTEC Higher National Certificate programme must contain a minimum of five units designated at H2 level.

Structure of Edexcel Level 5 BTEC Higher National Diploma in 3D Design

Unit No	Core units — all seven units must be taken	Unit level H1 or H2
1	Drawing Techniques and Approaches	H1
2	Historical and Contextual Referencing	H1
3	Properties of 3D Materials	H1
4	3D Technology and Processes	H1
5	Critical Study	H2
6	Professional Practice and Development	H2
7	Professional Studies	H2
	Specialist units — choose nine units	
8	Design Method	H1
9	Computer Applications in Art and Design	H1
10	Design Principles	H1
11	3D Animated Products	H1
12	Product Design	H1
13	Commercial Model Making	H2
14	Furniture Design	H2
15	Design for Performance	H2
16	Specialist 3D Materials	H2
17	Specialist 3D Technology and Processes	H2
18	Design and Function	H1
19	Visual and Personal Presentation	H1
20	Marketing	H1
21	Ceramics	H2
22	Jewellery, Accessories and Body Adornment	H2
23	Light Metals	H2
24	Wood	H2
25	Glass	H2
26	Exhibition and Retail Design	H2
27	Interior Design	H2

The BTEC Higher National Diploma programme must contain a minimum of eight units designated at H2 level.

Key features

BTEC Higher Nationals are designed to provide a specialist vocational programme, linked to professional body requirements and National Occupational Standards where appropriate, with a strong work related emphasis. The qualifications provide a thorough grounding in the key concepts and practical skills required in their sector and their national recognition by employers allows progression direct into employment. BTEC Higher Nationals offer a strong emphasis on practical skills development alongside the development of requisite knowledge and understanding in their sector. Learners are attracted to this strong vocational programme of study that meets their individual progression needs whether this is into employment or to further study on degree or professional courses.

A key progression path for BTEC Higher National Certificate and Diploma learners is to the second or third year of a degree or honours degree programme, depending on the match of the BTEC Higher National units to the degree programme in question.

BTEC Higher Nationals in 3D Design have been developed to focus on:

- providing education and training for a range of careers in 3D design
- providing opportunities for full-time learners to gain a nationally recognised vocationally specific qualification to enter employment in 3D design or progress to higher education vocational qualifications such as a full-time degree in 3D design or related area
- developing the knowledge, understanding and skills of learner in the field of 3D design
- providing opportunities for learners to focus on the development of higher level skills in a 3D design context
- providing opportunities for learners to develop a range of skills and techniques and attributes essential for successful performance in working life
- develop learners' ability to manage themselves
- develop learners' critical awareness and their ability to research and synthesise complex information
- develop learners' skills in communication and presentation
- develop learners' ability to handle information.

This qualification meets the needs of the above rationale by:

- equipping individuals with knowledge, understanding and skills for success in employment in the 3D design area
- enabling progression to an undergraduate degree or further professional qualification in 3D design or related area
- providing opportunities for specialist study relevant to individual vocations and contexts
- to support individuals employed or entering employment in the 3D design area
- developing the individual's ability in the 3D design area through effective use and combination of the knowledge and skills gained in different parts of the programme
- developing a range of skills and techniques, personal qualities and attributes essential for successful performance in working life and thereby enable learners to make an immediate contribution to 3D design
- providing flexibility, knowledge, skills and motivation as a basis for future studies and career development in the 3D design area.

Professional body recognition

The BTEC Higher Nationals in 3D Design have been developed with career progression and recognition by professional bodies in mind. It is essential that learners gain the maximum benefit from their programme of study.

Further details of professional body recognition and exemptions for BTEC Higher Nationals are given in the publication *BTEC Professional Recognition* which is available on Edexcel's website (www.edexcel.org.uk).

National Occupational Standards

BTEC Higher Nationals in 3D Design are designed to relate to the National Occupational Standards in the design sector at Level 5, which in turn form the basis of the design National Vocational Qualifications (NVQs). BTEC Higher Nationals do not purport to deliver occupational competence in the sector, which should be demonstrated in a work context. However, the qualifications provide underpinning knowledge for the National Occupational Standards, as well as developing practical skills in preparation for work and possible achievement of NVQs in due course.

Links to National Occupational Standards are indicated in each of the units.

Through the study of core and relevant specialist units learners will cover much of the underpinning knowledge, skills and understanding for Design NVQ Level 3. Mapping against the Design NVQ Level 3 is given in *Annex B*.

Qualification Requirement

Edexcel has published Qualification Requirements as part of the revision of BTEC Higher Nationals. Qualification Requirements set out the aims and rationale of the qualifications and provide the framework of curriculum content. They also identify the higher-level skills associated with the qualifications and any recognition by relevant professional bodies. The Qualification Requirement for BTEC Higher Nationals 3D Design is given in *Annex B*.

Edexcel standard specifications titles are developed from the Qualification Requirements. Licensed centres comply with Qualification Requirements when developing BTEC Higher Nationals under these standard titles.

Qualification Requirements provide consistent standards within the same vocational area and clearly identify the skills and knowledge that can be expected of any holder of an identical BTEC Higher National. This will allow higher education institutions, employers and professional bodies to confidently provide progression opportunities to successful learners.

Higher-level skills

Learners studying for BTEC Higher Nationals in 3D Design will be expected to develop the following skills during the programme of study:

- synthesis of a range of concepts, knowledge and skills relating to 3D design
- application of complex theories to practical realistic work situations in the 3D design sector
- independence of approach to study and the generation of 3D design evidence
- ability to engage with complex and/or unpredictable situations in 3D design contexts
- ability to take responsibility to manage and direct their own and others activities
- insight and judgement in relation to the margins and consequences of error

- research and investigative skills
- responsive to change and ability to multi-task
- ability to innovate and work in a creative way.

BTEC Higher National Certificate

The 10-unit BTEC Higher National Certificate in 3D Design provides a specialist work-related programme of study that covers the key knowledge, understanding and practical skills required in the design sector and also offers particular specialist emphasis through the choice of specialist units.

BTEC Higher National Certificates provide a nationally recognised qualification offering career progression and professional development for those already in employment and opportunities to progress into higher education. The qualifications are mode free but they are primarily undertaken by part-time learners studying over two years. In some sectors there are opportunities for those wishing to complete an intensive programme of study in a shorter period of time.

This specification provides centres with a framework to develop engaging programmes for higher-education learners who are clear about the area of employment that they wish to enter.

The BTEC Higher National Certificate in 3D Design mainly offers a progression route for learners who are employed in the Design sector.

Learners studying on the BTEC Higher National Certificate will be able to either gain employment in the design sector or continue their studies at BA or MA levels.

BTEC Higher National Diploma

The 16-unit BTEC Higher National Diploma provides greater breadth and specialisation than the BTEC Higher National Certificate. Higher National Diplomas are mode free but are followed predominately by full-time learners. They allow progression into or within employment in the design sector, either directly on achieving of the award or following further study to degree level.

The BTEC Higher National Diploma in 3D Design provides opportunities for learners to apply their knowledge and practical skills in the workplace. Full-time learners have the opportunity to do this through formal work placements or their part-time employment experience.

The qualification prepares learners for employment in the design sector and will be suitable for learners who have already decided that they wish to enter this area of work. Some adult learners may wish to make the commitment required by this qualification in order to enter a specialist area of employment in design or progress into higher education. Other learners may want to extend the specialism that they followed on the BTEC Higher National Certificate programme. Progression from this qualification may well be into or within employment in the Design sector.

The BTEC Higher National Diploma in 3D Design mainly offers a progression route for learners who are studying on an Art and Design Diploma in Foundation Studies course, a National Diploma in Design or a National Diploma in Art and Design.

Learners studying for the BTEC Higher National Diploma will be able to either gain employment in the design sector or continue their studies at BA or MA levels.

Teaching, learning and assessment

Learners must pass all 10 units on their programme of learning to be awarded a BTEC Higher National Certificate and all 16 units to be awarded a BTEC Higher National Diploma.

The assessment of BTEC Higher National qualifications is criterion-referenced and centres are required to assess learners' evidence against published learning outcomes and assessment criteria. All units will be individually graded as 'pass', 'merit' or 'distinction'. To achieve a pass grade for the unit learners must meet the assessment criteria set out in the specifications. This gives transparency to the assessment process and provides for the establishment of national standards for each qualification.

The units in BTEC Higher National qualifications all have a standard format which is designed to provide clear guidance on the requirements of the qualification for learners, assessors and those responsible for monitoring national standards.

Unit format

Each unit is set out in the following way.

Unit title, learning hours and NQF level

The unit title is accredited by QCA and this form of words will appear on the learner's Notification of Performance. In BTEC Higher National qualifications each unit consists of 60 guided learning hours.

Each unit is assigned a notional level indicator of H1 or H2, indicating the relative intellectual demand, complexity and depth of study, and learner autonomy.

At **H1 level** the emphasis is on the application of knowledge, skills and understanding, use of conventions in the field of study, use of analytical skills and selection and organisation of information.

At **H2 level** the emphasis is on application and evaluation of contrasting ideas, principles, theories and practices, greater specialisation in the field of study, and an increasing independence in systematic enquiry and analysis.

Description of unit

A brief description of the overall purpose of the unit is given, together with the key areas of study associated with the unit.

Summary of learning outcomes

The outcomes of the unit identify what each learner must do in order to pass it. Learners must achieve all the outcomes in order to pass the unit.

Content

This section picks up highlighted words from the outcomes and amplifies the content coverage required when addressing the outcomes. The content section will often provide lists of topics. Please note all aspects of the listed topics should be covered, except those that begin with 'eg', where items listed are merely indicative.

Outcomes and assessment criteria

Each unit contains statements of the evidence that each learner should produce in order to receive a pass.

Guidance

This section is not prescriptive but provides additional guidance and amplification related to the unit to support teachers/deliverers and assessors. Its subsections are given below. Only those subsections which apply to the unit will appear.

- *Delivery* — offers guidance about possible approaches to delivery. The guidance is based on the more usual delivery modes and is not intended to rule out alternative approaches.
- *Assessment* — provides advice about the nature and type of evidence that learners are likely to need to produce. This subsection should be read in conjunction with the assessment criteria and the generic grade descriptors.
- *Links* — sets out the links between units. Provides opportunities for integration of learning, delivery and assessment. Any links to the National Occupational Standards will be highlighted here.
- *Resources* — identifies the specialist resources likely to be needed to allow learners to generate the evidence required by each unit. The centre will be asked to ensure that this resource requirement is in place when it seeks approval from Edexcel to offer the qualification.
- *Support materials* — identifies, where appropriate, textbooks, videos, magazines, journals, publications and websites that may support the delivery of the unit.

Learning and assessment

The purpose of assessment is to ensure that effective learning of the content of each unit has taken place. Evidence of this learning, or the application of the learning etc, is required for each unit. The assessment of the evidence relates directly to the assessment criteria for each unit, supported by the generic grade descriptors.

The process of assessment can aid effective learning by seeking and interpreting evidence to decide the stage that learners have reached in their learning, what further learning needs to take place and how best to do this. Therefore, the process of assessment should be part of the effective planning of teaching and learning by providing opportunities for both the learner and assessor to obtain information about progress towards learning goals. The assessor and learner must be actively engaged in promoting a common understanding of the assessment criteria and the grade descriptors (what it is they are trying to achieve and how well they achieve it) for further learning to take place. Therefore, learners need constructive feedback and guidance about how to improve, capitalising on strengths, with clear and constructive comments about weaknesses and how these might be addressed.

Assessment instruments are constructed by centres. Assessment instruments should collectively ensure coverage of all assessment criteria within each unit and should provide opportunities for the evidencing of all the grade descriptors. It is advised that assessment criteria and contextualised grade descriptors are clearly indicated on each assessment instrument to provide a focus for learners (for transparency and to ensure that feedback is specific to the criteria) and to assist with internal standardisation processes. Tasks/activities should enable learners to produce evidence that relates directly to the assessment criteria and grade descriptors.

When centres are designing assessment instruments, they need to ensure that the instruments are valid, reliable and fit for purpose, building on the application of the assessment criteria. Centres are encouraged to place emphasis on practical application of the assessment criteria, providing a realistic scenario for learners to adopt, making maximum use of work-related practical experience and reflecting typical practice in the sector concerned. The creation of assessment instruments that are fit for purpose is vital to achievement and their importance cannot be over-emphasised.

Grading Higher National units

The assessment of BTEC Higher National qualifications will be at unit level and there will be no overall grade for either the Certificate or the Diploma. This means that learners are able to access the qualification through a unitised approach.

Each unit will be graded as a pass, merit or distinction. A pass is awarded for the achievement of all outcomes against the specified assessment criteria. Merit and distinction grades are awarded for higher-level achievement.

The generic merit and distinction grade descriptors listed on pages 11–12 are for grading the total evidence produced for each unit and describe the learner's performance over and above that for a pass grade.

Summary of grades

In order to achieve a pass	<ul style="list-style-type: none">• all outcomes and associated assessment criteria have been met
In order to achieve a merit	<ul style="list-style-type: none">• pass requirements achieved• all merit grade descriptors achieved
In order to achieve a distinction	<ul style="list-style-type: none">• pass and merit requirements achieved• all distinction grade descriptors achieved

The merit and distinction grade descriptors can be achieved in a flexible way, eg in a sequential or holistic mode, to reflect the nature of the sector concerned.

Each of the generic merit and distinction grade descriptors can be amplified by use of **indicative characteristics**. These give a guide to the expected learner performance, and support the generic grade descriptors. The indicative characteristics should reflect the nature of a unit and the context of the sector programme.

The indicative characteristics shown in the table for each of the generic grade descriptors are not exhaustive. Consequently, centres should select from the list or may construct other appropriate indicative characteristics for their sector programme which may be drawn from the appropriate higher-level skills. It is important to note that each assessment activity does not need to incorporate all the merit and/or distinction grade descriptors.

Contextualising the generic grade descriptors

The generic merit and distinction grade descriptors need to be viewed as a qualitative extension of the assessment criteria for pass within each individual unit. The relevant generic grade descriptors must be identified and specified within an assignment and the relevant indicative characteristics should be used to place the required evidence in context.

Grade descriptors

Pass grade

A **pass grade** is achieved by meeting all the requirements defined in the assessment criteria for pass for each unit.

Merit grade

Merit descriptors	Indicative characteristics
In order to achieve a merit the learner must:	The learner's evidence shows:
<ul style="list-style-type: none"> identify and apply strategies to find appropriate solutions 	<ul style="list-style-type: none"> effective judgements have been made complex problems with more than one variable have been explored an effective approach to study and research has been applied
<ul style="list-style-type: none"> select/design and apply appropriate methods/techniques 	<ul style="list-style-type: none"> relevant theories and techniques have been applied a range of methods and techniques have been applied a range of sources of information has been used the selection of methods and techniques/sources has been justified the design of methods/techniques has been justified complex information/data has been synthesised and processed appropriate learning methods/techniques have been applied
<ul style="list-style-type: none"> present and communicate appropriate findings 	<ul style="list-style-type: none"> the appropriate structure and approach has been used coherent, logical development of principles/concepts for the intended audience a range of methods of presentation have been used and technical language has been accurately used communication has taken place in familiar and unfamiliar contexts the communication is appropriate for familiar and unfamiliar audiences and appropriate media have been used

Distinction grade

Distinction descriptors	Indicative characteristics
<p>In order to achieve a distinction the learner must:</p>	<p>The learner's evidence shows:</p>
<ul style="list-style-type: none"> • use critical reflection to evaluate own work and justify valid conclusions 	<ul style="list-style-type: none"> • conclusions have been arrived at through synthesis of ideas and have been justified • the validity of results has been evaluated using defined criteria • self-criticism of approach has taken place • realistic improvements have been proposed against defined characteristics for success
<ul style="list-style-type: none"> • take responsibility for managing and organising activities 	<ul style="list-style-type: none"> • autonomy/independence has been demonstrated • substantial activities, projects or investigations have been planned, managed and organised • activities have been managed • the unforeseen has been accommodated • the importance of interdependence has been recognised and achieved
<ul style="list-style-type: none"> • demonstrate convergent/lateral/creative thinking 	<ul style="list-style-type: none"> • ideas have been generated and decisions taken • self-evaluation has taken place • convergent and lateral thinking have been applied • problems have been solved • innovation and creative thought have been applied • receptiveness to new ideas is evident • effective thinking has taken place in unfamiliar contexts

Accreditation of Prior Learning (APL)

Edexcel encourages centres to recognise learners' previous achievements and experience through APL. Learners may have evidence that has been generated during previous study, in their previous or current employment or whilst undertaking voluntary work that relates to one or more of the units in the qualification. Assessors should assess this evidence against the Higher National standards in the specifications in the normal way. As with all evidence, assessors should be satisfied about the authenticity and currency of the material when considering whether or not the outcomes of the unit have been met.

Full guidance about Edexcel's policy on APL is provided on our website (www.edexcel.org.uk).

Quality assurance of BTEC Higher Nationals

The quality assurance system for BTEC Higher National qualifications, as higher-level vocational qualifications at Level 5 on the NQF, will comprise three main components.

- **approval process** — a control measure to confirm that individual centres (and programme teams) are appropriately resourced and competent to deliver a BTEC Level 5 programme of study.
- **monitoring of centres** — a method of monitoring centres' internal quality systems to ensure ongoing fulfilment of initial requirements and, where appropriate, enhancement of those requirements to accommodate new qualifications.
- **independent assessment** — a measure that provides independence within the assessment process, so that the certificated outcomes for each learner are not reliant on determinations by individuals or groups with a vested interest in the outcome. This measure should be consistent and reliable over time, and should not create unnecessary barriers.

Centre and programme approval

Approval to offer BTEC Higher National qualifications will vary depending on the status of the centre. Centres that have a recent history of delivering BTEC Higher National qualifications and have an acceptable quality profile in relation to their delivery will be able to gain approval through an accelerated process. Centres that are new to the delivery of BTEC Higher National qualifications will be required to submit evidence to demonstrate that they:

- have the human and physical resources required for effective delivery and assessment
- understand the implications for independent assessment and agree to abide by these
- have a robust internal assessment system supported by 'fit for purpose' assessment documentation
- have a system to internally verify assessment decisions to ensure standardised assessment decisions are made across all assessors and sites.

Such applications have to be supported by the head of the centre (principal, chief executive, etc).

We communicate all approvals in writing to the head of centre in the form of a qualification approval letter. The approval letter will also contain a programme definition for each qualification approved. The programme definition clearly states to the centre all units that comprise the qualification for which the centre is approved.

Monitoring centres' internal quality systems

Centres will be expected to demonstrate ongoing fulfilment of approval criteria across all programme areas. This should include the consistent application of policies affecting learner registrations and appeals, together with the effectiveness of internal examination and standardisation processes.

Centres may opt for a review of their provision under the quality verifier/quality reviewer arrangements, which already apply to all further education centres. Alternatively, centres may present evidence of their operation within a recognised code of practice, such as that of the Quality Assurance Agency for Higher Education. Edexcel reserves the right to confirm independently that these arrangements are operating to our satisfaction.

Independent assessment: the role of the external examiner

Supporting consistency and appropriateness of centre assessor decisions

For all BTEC Higher Nationals accredited at Level 5 on the NQF, Edexcel will appoint appropriately qualified subject-specific external examiners to the programme in each centre. Edexcel will define the selection, appointment and training process, together with the roles and responsibilities of the external examiners and will communicate the details to centres in a centre handbook.

The function of the external examiner will be to review and evaluate objectively the assessment process and standards of learner attainment by independently reviewing, in the first year of the programme, a sample of learner work (including the centre-designed assignments on which the samples are based) selected by the external examiner, from across the programme.

When they visit centres, external examiners must be afforded reasonable access to the assessed parts of the programme, including evidence of learner performance on placement. They are required to:

- verify that standards are appropriate for the qualification and its elements
- assist institutions in the comparison of academic standards across similar awards nationally.

Should any disparity occur between the judgement of centre assessors and that of the external examiner, this will be reported to the centre and to Edexcel by the external examiner. The centre will be required to agree appropriate corrective action as a result of this report.

Independence in confirmation of certificated outcomes

In the final year of the programme, the external examiner will revisit the centre in order to independently assess learner work and to evaluate centre assessor decisions on final outcomes. This process of evaluation may focus upon work in units, selected by the external examiner, that present the most appropriate evidence for this exercise. The work of all learners not already sampled in the first year of the programme will be reviewed.

Resolution of assessments will normally be handled at the centre's final programme review board. The external examiner will be expected to endorse the outcomes of assessment before certification can be authorised. Should the external examiner be unable to provide such endorsement, certification will be withheld until appropriate corrective action has taken place. (The senior subject examiner may become involved in such instances).

The external examiner will be required to prepare a written report after each visit. The report will include comments from the external examiner on:

- academic standards and programme specification
- academic standards and learner performance
- academic standards and assessment

- the assessment process
- assessment meetings
- physical resources
- comments of learners
- meetings with staff
- external examiner practice
- issues arising from previous reports
- details of sampling
- general points, areas of good practice and major issues
- action points.

The external examiner report provides the mechanism by which the external examiner independently verifies learner ability, endorses the validity of the assessment process and releases certification for a cohort.

The report is a confidential document between Edexcel, the appointed external examiner, and the centre to use for internal/external quality assurance processes. It provides the centre with feedback on the external examining process and on the judgements that determine the external examiner's decisions on endorsement, or otherwise, of learner outcomes.

Programme design and delivery

The qualifications consist of core units (which are mandatory) and specialist units. These specialist units will be mostly optional and are designed to provide a specific focus to the qualification. Required combinations of specialist units are clearly set out in relation to each qualification in the defined qualification structures provided in this document.

In BTEC Higher National qualifications each unit consists of 60 guided learning hours. The definition of guided learning hours is 'a notional measure of the substance of a qualification'. It includes an estimate of time that might be allocated to direct teaching, instruction and assessment, together with other structured learning time such as directed assignments or supported individual study. It excludes learner-initiated private study. Centres are advised to consider this definition when planning the programme of study associated with this specification.

Mode of delivery

Edexcel does not define the mode of study for BTEC Higher National qualifications. Centres are free to offer the qualifications using any mode of delivery that meets the needs of their learners. This may be through traditional classroom teaching, open learning, distance learning or a combination of these. Whatever mode of delivery is used, centres must ensure that learners have appropriate access to the resources identified in the specifications and to the subject specialists delivering the units. This is particularly important for learners studying for the qualification through open or distance learning.

Full guidance on Edexcel's policies on 'distance assessment' and 'electronic assessment' are provided on our website.

Learners studying for the qualification on a part-time basis bring with them a wealth of experience that should be utilised to maximum effect by tutors and assessors. Assessment instruments based on learners' work environments should be encouraged. Those planning the programme should aim to enhance the vocational nature of the BTEC Higher National qualification by:

- liaising with employers to ensure that the course is relevant to the specific needs of the learners
- accessing and using non-confidential data and documents from learners' workplaces
- including sponsoring employers in the delivery of the programme and, where appropriate, in the assessment
- linking with company-based/workplace training programmes
- making full use of the variety of experiences of work and life that learners bring to the programme.

Resources

BTEC Higher National qualifications are designed to prepare learners for employment in specific sectors. Physical resources need to support the delivery of the programme and the proper assessment of the outcomes and, therefore, should normally be of industry standard. Staff delivering programmes and conducting the assessments should be fully familiar with current practice and standards in the sector concerned. Centres will need to meet any specialist resource requirements when they seek approval from Edexcel.

Please refer to the resource section in individual units for specialist resource requirements.

Delivery approach

It is important that centres develop an approach to teaching and learning that supports the specialist vocational nature of the BTEC Higher National qualifications. The specifications contain a balance of practical skill development and knowledge requirements, some of which can be theoretical in nature. Tutors and assessors need to ensure that appropriate links are made between theory and practice and that the knowledge base is applied to the sector. This will require the development of relevant and up-to-date teaching materials that allow learners to apply their learning to actual events and activity within the sector. Maximum use should be made of the learner's experience.

Meeting local needs

Centres should note the qualifications set out in these specifications have been developed in consultation with centres, employers and the Creative and Cultural Industries Sector Skills Council. The units are designed to meet the skill needs of the sector and the specialist units allow coverage of the full range of employment. Centres should make maximum use of the choice available to them within the specialist units in these specifications to meet the needs of their learners, as well as the local skills and training needs identified by organisations such as Regional Development Agencies and Local Learning and Skills Councils.

Centres may not always be able to meet local needs using the units in this specification. In this situation, centres may seek approval from Edexcel to make use of units from other standard NQF BTEC Higher National specifications. Centres will need to justify the need for importing units from other specifications and Edexcel will ensure that the vocational focus of the qualification has not been diluted.

Locally-devised specialist units

There may be exceptional circumstances where even the flexibility of importing units from other specifications does not meet a particular local need. In this case, centres can seek permission from Edexcel to develop a unit with us to meet this need. The cases where this will be allowable will be very limited. Edexcel will ensure that the integrity of the qualification is not reduced and that there is a minimum of overlap and duplication of content of existing units. Centres will need strong evidence of the local need and the reasons why the existing standard units are inappropriate. Edexcel will need to validate these units.

Limitations on variations from standard specifications

The flexibility to import standard units from other BTEC Higher National specifications and/or to develop unique locally-devised specialist units is **limited to a maximum of four units in a BTEC Higher National Diploma qualification and a maximum of two units only in any BTEC Higher National Certificate qualification**. The use of these units cannot be at the expense of the core units in any qualification.

Access and recruitment

Edexcel's policy regarding access to its qualifications is that:

- the qualifications should be available to everyone who is capable of reaching the required standards
- the qualifications should be free from any barriers that restrict access and progression
- there should be equal opportunities for all wishing to access the qualifications.

Centres are required to recruit learners to BTEC qualifications with integrity. This will include ensuring that applicants have appropriate information and advice about the qualifications and that the qualification will meet their needs. Centres should take appropriate steps to assess each applicant's potential and make a professional judgement about their ability to successfully complete the programme of study and achieve the qualification. This assessment will need to take account of the support available to the learner within the centre during their programme of study and any specific support that might be necessary to allow the learner to access the assessment for the qualification. Centres should also show regard for Edexcel's policy on learners with particular requirements.

Centres will need to review the profile of qualifications and/or experience held by applicants, considering whether this profile shows an ability to progress to a Level 5 qualification. For learners who have recently been in education, the entry profile is likely to include one of the following:

- a BTEC National Certificate or Diploma in Design or Art and Design
- an AVCE/Advanced GNVQ in an appropriate vocational area
- a GCE Advanced level profile which demonstrates strong performance in a relevant subject or an adequate performance in more than one GCE subject. This profile is likely to be supported by GCSE grades at A* to C
- other related Level 3 qualifications
- an Access to Higher Education Certificate awarded by an approved further education institution
- related work experience.

Mature learners may present a more varied profile of achievement that is likely to include extensive work experience (paid and/or unpaid) and/or achievement of a range of professional qualifications in their work sector.

Restrictions on learner entry

The majority of BTEC Higher National qualifications are accredited on the NQF for learners aged 16 years and over. Learners aged 15 and under cannot be registered for a BTEC Higher National qualification.

Access arrangements and special considerations

Edexcel's policy on access arrangements and special considerations for BTEC and Edexcel NVQ qualifications aims to enhance access to the qualifications for learners with disabilities and other difficulties (as defined by the Disability Discrimination Act 1995 and the amendments to the Act) without compromising the assessment of skills, knowledge, understanding or competence.

Further details are given in the policy Access Arrangements and Special Considerations for BTEC and Edexcel NVQ Qualifications, which is on the Edexcel website (www.edexcel.org.uk). This policy replaces the previous Edexcel policy (*Assessment of Vocationally Related Qualification: Regulations and Guidance Relating to Learners with Special Requirements, 2002*) concerning learners with particular requirements.

The wider curriculum

The study of the BTEC Higher Nationals in 3D Design provides opportunities for learners to develop an understanding of spiritual, moral, ethical, social and cultural issues and an awareness of environmental issues, health and safety considerations, and European developments. These wider curriculum opportunities are indicated in the units as appropriate. Mapping of wider curriculum opportunities issues is provided in *Annex C*.

Spiritual, moral, ethical, social and cultural issues

The specification contributes to an understanding of:

- spiritual issues through an appreciation of the spiritual dimension to 3D design, particularly when 3D design is seen through a historical context, for example in Units 2 and 5
- moral and ethical issues are encountered throughout the BTEC Higher Nationals in 3D Design as dealing with people will always involve the learner engaging in moral and ethical issues. A more detailed analysis is given in certain units such as Units 6 and 20
- social and cultural issues are encountered throughout the BTEC Higher Nationals in 3D Design.

Environmental issues

Learners are led to believe the importance of environmental issues as they engage in 3D design study as well as through experience of the 3D design industry, in Units 7 and 24.

European developments

Much of the content of the BTEC Higher National in 3D Design, because of its global nature, is applicable throughout Europe, even though the context of the delivery is within the UK. The European dimensions of 3D design are specifically addressed in Unit 26.

Health and safety issues

The BTEC Higher Nationals in 3D Design are practically based and so health and safety issues are encountered throughout the courses. Learners will develop awareness of the safety of others as well as themselves in all practical activities. Learners will also explore health and safety issues across the 3D Design industry, particularly in Unit 21 and Unit 23.

Equal opportunities issues

Equal opportunities issues are implicit throughout the BTEC Higher Nationals in 3D Design.

Useful publications

Further copies of this document and related publications can be obtained from:

Edexcel Publications

Adamsway

Mansfield

Nottinghamshire NG18 4FN

Telephone: 01623 467 467

Fax: 01623 450 481

Email: publications@linneydirect.com

Related publications include:

- the current Edexcel publications catalogue and update catalogue
- Edexcel publications concerning the quality assurance system and the internal and external verification of vocationally-related programmes may be found on the Edexcel website and in the Edexcel publications catalogue.

NB: Most of our publications are priced. There is also a charge for postage and packing. Please check the cost when you order.

Professional body contact details

Creative and Cultural Skills

11 Southwark Street

London SE1 1RQ

Fax: 0113 244 8577

Website: www.ccskills.org.uk

Email: info@ccskills.org.uk

How to obtain National Occupational Standards

The National Occupational Standards for 3D Design can be obtained from:

Creative and Cultural Skills

11 Southwark Street
London SE1 1RQ

Fax: 0113 244 8577
Website: www.ccskills.org.uk
Email: info@ccskills.org.uk

Professional development and training

Edexcel supports UK and international customers with training related to BTEC qualifications. This support is available through a choice of training options offered in our published training directory or through customised training at your centre.

The support we offer focuses on a range of issues including:

- planning for the delivery of a new programme
- planning for assessment and grading
- developing effective assignments
- building your team and teamwork skills
- developing student-centred learning and teaching approaches
- building key skills into your programme
- building in effective and efficient quality assurance systems.

The national programme of training we offer can be viewed on the Edexcel website (www.edexcel.org.uk). You can request customised training through the website or by contacting one of our advisers in the Professional Development and Training Team on telephone number 0870 240 9800 to discuss your training needs.

The training we provide:

- is active — ideas are developed and applied
- is designed to be supportive and thought provoking
- builds on best practice.

Our training will also underpin many areas of the Higher Education Staff Development Agency (HESDA)/FENTO standards for teachers and lecturers working towards them.

Further information

For further information please call Customer Services on 0870 240 9800, or visit our website at www.edexcel.org.uk.

Core units

Unit 1: Drawing Techniques and Approaches

Learning hours: 60

NQF Level 5: BTEC Higher National – H1

Description of unit

In this unit learners will be encouraged to develop visual thinking and creativity for design work. This unit will enable learners to experiment with drawing approaches and techniques in order to broaden their experience and understanding of visual language. Learners will need to use materials and media which are specific to drawing and 3D design, as well as unusual materials and media which may extend visual language and creativity.

Summary of learning outcomes

To achieve this unit a learner must:

- 1 Comprehend the specific nature and qualities of **drawing media and materials**
- 2 Demonstrate creative use of **drawing techniques and processes**
- 3 Develop and extend understanding of **visual language**
- 4 Evaluate work for further **development**.

Content

1 Drawing media and materials

Drawing medium: pencil, compressed/willow charcoal, marker pens, chalk, oil, pastels, graphite, dry pigment, silver point, inks, dyes, various paints

Technological media: computers, lens-based media

Specific nature and qualities of drawing medium: mark-making techniques using a range of wet and dry media, use of media in traditional and non-traditional ways, own and other's work

2 Drawing techniques and processes

Application of materials and techniques: traditional, non-traditional technologies, 2D, 3D and 4D

Contrasting concepts: for example — hot/cold, dry/wet, soft/hard, alive/dead, dark/light

Alternative contexts: life drawing, perspective drawing, analytical studies, environmental drawing

3 Visual language

Visual language: the clarification and utilisation of visual coding and decoding, including semiotics, semantics, symbolism, icons and concepts

Formal elements: colour, line, pattern, texture, form and tone, structure, weight, composition, mass, space, volume, proportion, scale, balance, movement

Personal and/or emotional response: through the intentional use of layout and composition, stability, energy, movement, harmony, discord, balance, disparity or distortion

4 Development

Evaluate and analyse: de-construction of outcomes, identify strengths, weaknesses, successes or failures, application of criteria for the analysis and evaluation of creativity

Adaptation: combination, modification and re-construction of outcomes

Outcomes and assessment criteria

Outcomes	Assessment criteria for pass To achieve each outcome a learner must demonstrate the ability to:
1 Comprehend the specific nature and qualities of drawing media and materials	<ul style="list-style-type: none"> • research and record specific qualities of various media in own and others' work • produce a range of competent work showing use of various media in traditional and non-traditional ways
2 Demonstrate creative use of drawing techniques and processes	<ul style="list-style-type: none"> • present a juxtaposition of concepts, subjects, techniques and materials through a range of work • show originality and innovation
3 Develop and extend understanding of visual language	<ul style="list-style-type: none"> • apply materials in a range of work to express a personal/emotional response • manipulate formal elements in a range of work to evoke emotional response • critically analyse others' work
4 Evaluate work for further development	<ul style="list-style-type: none"> • produce a range of evocative, expressive work for development • prepare work for presentation • analyse and evaluate own work in terms of creativity through discussion

Guidance

Delivery

Delivery of this unit should be practical and motivating for the learners. An experimental approach is required to encourage learners to broaden their visual language and creativity. Learners should be exposed to as wide a range of good-quality examples as possible. In particular the study of visual language in relation to different cultural contexts should be wide ranging, with a particular focus on mark-making techniques, formal elements, and responses, moods and emotions evoked. Learners should be encouraged to look at contemporary youth culture as well as historic sources for reference.

Learners should be encouraged to experiment in their own work, and evaluate their own use of visual language. Unusual materials and media which may extend visual thinking and creativity, as well as materials and media which are specific to art, craft and design, should be used.

Learners should demonstrate their knowledge and understanding in a range of ways, through discussion, presentation, criticism with tutors, professional practitioners and the peer group.

Formal elements and visual dynamics are essential parts of the vocabulary for all artists, craftspeople and designers. These technical terms should be used in discussion with learners about 3D design work.

Research is a basic skill that is developed through this unit in order to broaden visual thinking and creativity in 3D design. Learners will need to be encouraged to research others' work and critically analyse their use of materials and media, techniques and processes to improve the quality of their own work. Learners should be shown how to record sources carefully and accurately citing authors, titles of books, articles, journals and publications, date of publication, place of publication and country of publication.

Assessment

Evidence for this unit can be generated through exploratory work using the formal elements of 2D visual language and mark-making techniques. Work produced should communicate a theme effectively and evoke responses from the viewer.

Learners can present their analysis and evaluation of their own and others' work in written assignments or to peer groups and/or tutors for discussion. Learners should be able to articulate their own thinking using appropriate language, through discussion and evaluation, demonstrating a broader understanding of visual thinking and creativity in their work.

Links

This unit can link to all other units as a developmental unit. Drawing is of central importance to this qualification and learners must be able to think visually. It could be used as part of a vocationally-focused assignment which embraces both practical and more theoretical units.

This unit also links with the following units in the National Occupational Standards (NOS):

- Unit 32: Element 3
- Unit 33: Elements 2 and 3
- Unit 34: Element 1.

Resources

For practical work, basic studio resources will be required.

Resources for research may include a learning resource centre, the internet, CD-Roms, databases, specialist publications, galleries, exhibitions, questionnaires and interviews with practitioners.

Support materials

Books

Berger J — *Ways of Seeing* (Penguin Books and BBC, London, 1973)

Berger J — *About Looking* (Peter Smith Publications, 1992)

Gombrich E H — *Art and Illusion: A Study of the Psychology of Pictorial Representation* (Phaidon Press Limited, 1995)

Hoffman D — *Visual Intelligence — What We Create and What We See* (WW Norton & Company, 1998)

Unit 2: Historical and Contextual Referencing

Learning hours: 60

NOF Level 5: BTEC Higher National – H1

Description of unit

This unit introduces learners to the cultural history which informs current thought and debate in 3D design. Emphasis is on research and study skills and learners acquiring source material and knowledge. Presentation skills will also be applied in a practical context.

Summary of learning outcomes

To achieve this unit a learner must:

- 1 Undertake in-depth **research** using electronic sources and paper-based materials
- 2 Demonstrate an understanding of creative **influences** through the effective interpretation and analysis of information
- 3 Assess, interpret and evaluate **information** effectively and develop a personal view
- 4 Present **conclusions** effectively.

Content

1 **Research**

Electronics sources: eg retrieval of computer-based data, internet, CD-Rom, local and distant films, videos

Paper-based materials: eg use of library, learning resource centre, lectures, group presentations, study skills, local and distant

Other sources: eg visits to collections, museums, original sources, local and distant

2 **Influences**

Historical and cultural histories: eg major historical movements, modern practitioners, relationship between modern practice and historical sources, current attitudes towards the arts, current cultural context, historical concepts and principles versus modern notions of moral and ethical practice

Making judgements: questioning, comparing, measuring, observing, evaluating

3 **Information**

Sources: personal research, primary, secondary

Synthesis: ideas, influences, observation, personal view

4 **Conclusions**

Presentation forms: eg oral presentation, illustrated written communication

Outcomes and assessment criteria

Outcomes	Assessment criteria for pass To achieve each outcome a learner must demonstrate the ability to:
1 Undertake in-depth research using electronic sources and paper-based materials	<ul style="list-style-type: none"> • research a variety of appropriate areas of study using paper-based materials effectively • research a variety of appropriate areas of study using electronic sources effectively
2 Demonstrate an understanding of creative influences through the effective interpretation and analysis of information	<ul style="list-style-type: none"> • research the major historical movements and cultural attitudes that have influenced modern practitioners • interpret and analyse information effectively • demonstrate an understanding of creative influences
3 Assess, interpret and evaluate information effectively and develop a personal view	<ul style="list-style-type: none"> • assess and interpret primary and secondary sources information • evaluate information and develop personal view
4 Present conclusions effectively	<ul style="list-style-type: none"> • select and use appropriate presentation techniques to communicate research information

Guidance

Delivery

The unit should be underpinned by an introduction to study skills and research techniques needed by learners. Emphasis should be placed upon the techniques themselves rather than the information, so that the skills can be acquired. With these, learners may undertake research which is of practical use.

It may be appropriate to introduce learners to case studies of research programmes that have culminated in culturally influential outcomes.

Assessment

For this unit learners could have a series of lectures on the historical and cultural developments which inform current thought and debate towards the arts.

Presentation will be an important element in demonstrating learners' learning. Notebooks and scrapbooks should indicate that learners understand and have developed information received in the lecture programme.

Learners could make an oral presentation followed by an illustrated essay. This essay could form part of the learner's practical work, and could be linked with practical units.

Links

Research undertaken for this unit can be linked to practical work in another unit, for example *Unit 21: Ceramics*, *Unit 22: Jewellery, Accessories and Body Adornment* and *Unit 23: Light Metals*. The units could be covered by an integrated assignment that embraces both units.

This unit also links with the following units in the National Occupational Standards (NOS):

- Unit 31: Element 1
- Unit 3D: Elements 1, 2 and 3.

Resources

The learning resources centre includes books, CD-Rom, newspapers, magazines, bibliographical material available through the inter-library loan system and the internet. Specific texts relating to the delivery of this unit should be specified by the centre.

Support materials

Books

Pensver N — *Pioneers of Modern Design* (Penguin Books, London, 1991)

Walter J A — *Design History and the History of Design* (Photopress, London, 1989)

Unit 3: Properties of 3D Materials

Learning hours: 60

NOF Level 5: BTEC Higher National – H1

Description of unit

This unit provides the essential underpinning knowledge of the basic types of materials common to the broad area of 3D design. It will provide the learner with an understanding of the implications of using and selecting materials for the 3D designer. This has implications for the design of artefacts and products, and learners will learn to identify the strengths and weaknesses in both the practical and aesthetic senses.

Summary of learning outcomes

To achieve this unit a learner must:

- 1 Research and evaluate the **characteristics of 3D materials**
- 2 Practically investigate **3D materials**
- 3 Demonstrate the creative and effective **use of 3D materials**
- 4 **Evaluate** the results of using 3D materials.

Content

1 Characteristics of 3D materials

Physical qualities: electrical, thermal, durability, strength, stability, structural

Visual qualities: transparency, opacity, reflective, contrasting/complementary colours, surfaces, patterns, textures

Inventive and experimental qualities: unusual combinations of materials and finishes

2 3D materials

Naturally occurring materials: clay, softwood, hardwood, stone, gemstone, ores, natural fibres

Man-made materials: ferrous metals, non-ferrous metals, thermo-plastics thermo-setting plastics, structural boards

3 Use of 3D materials

Functional: models, products, structures, spatial arrangements

Creative: representational, symbolic, environmental, commemorative, decorative

Effectiveness of materials: combining functional needs with creative uses, exploiting physical properties, exploiting visual qualities

4 Evaluate

Feedback: user questionnaire, market research, trade journals

Use: design for specific purposes, appropriateness to function, fitness for purpose, aesthetic qualities, user/viewer/client/market response

Applications of materials: for surfaces, for structures, in relation to function, form and visual qualities

Outcomes and assessment criteria

Outcomes	Assessment criteria for pass To achieve each outcome a learner must demonstrate the ability to:
1 Research and evaluate the characteristics of 3D materials	<ul style="list-style-type: none"> • research and record specific qualities of materials in own and others' work • identify and record examples of the creative use of material characteristics in 3D work
2 Practically investigate 3D materials	<ul style="list-style-type: none"> • work with a variety of materials and experiment with their properties • evaluate the characteristics of 3D materials
3 Demonstrate the creative and effective use of 3D materials	<ul style="list-style-type: none"> • produce 3D work safely which exploits the functional characteristics of a range of materials • produce 3D work safely which experiments with the creative potential of a range of materials • explore different approaches to the effective use of materials in 3D work
4 Evaluate and analyse the results of using 3D materials	<ul style="list-style-type: none"> • establish criteria for assessing the effectiveness of materials used in design work • assess the effectiveness of materials used in design work

Guidance

Delivery

An active experimental approach will encourage learners to broaden their understanding of the creative and utilitarian possibilities of the range of materials available to the designer. The links between materials, tools and processes require the learner to respect the workplace, the skills of specialists and the reasons for health and safety legislation.

Learners will need to work with both malleable and resistant materials and safety in handling, these materials is very important.

Learners should be encouraged to research and critically analyse the way others have used materials in 3D work. The creation of work with a functional emphasis could include products which use sophisticated materials for highly specific purposes such as for use in hazardous environments, space, deep sea etc. Research is a basic skill that is developed through this unit in order to broaden the learner's understanding of the design potential of materials, the underlying implications of the nature and source of materials, and their availability and their cost.

Learners should be encouraged to experiment with using materials and finishes and evaluate their use.

Assessment

As well as developing detailed skills and understanding in those materials that are relevant to their chosen specialism, learners are expected to understand the potential of a broad range of materials.

Analysis of others' work, outcome 1, and learners' own work, outcome 4, may be presented as written assignments in an appropriate format or presented to peer groups and/or tutors for discussion. Learners should be able to articulate their own thinking using appropriate language, through discussion and evaluation, demonstrating a broader understanding of materials and their potential in both creative work and in the production of functional and reliable products. The design work in outcome 3 can be presented in any suitable format.

Links

This unit parallels *Unit 4: 3D Technology and Processes* and provides essential underpinning skills and knowledge for optional units such as *Unit 16: Specialist 3D Materials*, *Unit 17: Specialist 3D Technology and Processes* and *Unit 18: Design and Function*.

This unit also links with the following units in the National Occupational Standards (NOS):

- Unit 32: Elements 1, 2 and 3
- Unit 3D: Element 1, 2 and 3.

Resources

This unit requires access to workshop facilities suitably equipped to permit work in wood, metal and plastics and a multi-purpose sculpture area for clay, foam, plaster, latex work.

Suggested sources for research include the library, the internet, CD-Roms, databases, specialist publications, galleries, exhibitions, questionnaires and interviews with practitioners.

Support materials

Books

Benjamin A — *Sculpture: Contemporary Form and Theory* (Wiley Academy, 1997)

Cleminshaw D — *Design in Plastics* (Rockport Publishers, 1989)

Goldsworthy A — *Stone* (Viking, 1994)

Goldsworthy A — *Wood* (Viking, 1996)

Penny N — *The Materials of Sculpture* (Yale University Press, 1993)

Unit 4: 3D Technology and Processes

Learning hours: 60

NQF Level 5: BTEC Higher National – H1

Description of unit

This unit provides the essential underpinning skills and knowledge for the basic processes and technology common to the broad area of 3D design. Technological change increasingly affects the processes associated with designing and producing. This unit encourages the development of technologically driven change. It is a practical unit which allows learners to embrace technology creatively.

Summary of learning outcomes

To achieve this unit a learner must:

- 1 Research and evaluate the **creative and functional characteristics** of technology and processes
- 2 Experiment creatively with a range of **technology and processes**
- 3 Demonstrate the **creative and functional use** of technology and processes
- 4 Evaluate and analyse the **results** of using technology and processes.

Content

1 **Creative and functional characteristics**

Aesthetic effects: eg visual, tactile, physical change

Functional advantages: increasing competitive edge, to production process, eg efficiency, precision, consistency; to outcome, eg reliability, performance

2 **Technology and processes**

Technologies: hand tools and equipment, machinery, computer aided, associated with processes, materials and stages of production, eg preparation, processing, assembling, finishing, checking

Processes: eg cutting, manipulation, redistribution, removal, joining, finishing

3 **Creative and functional use**

Situations: eg artefacts, products, spatial arrangements

Purpose: eg reduce costs, enhance lifestyle, reduce risk, increase reliability, improve performance

Scale of production: eg individual one-off, batch, large-scale production

4 **Results**

Effects: product innovation — on output, quality, cost, health and safety

Feedback: objective, subjective

Assessment criteria: eg derived from brief, product specification, environmental and safety standards, related to costs, materials use, functional effectiveness

Outcomes and assessment criteria

Outcomes	Assessment criteria for pass To achieve each outcome a learner must demonstrate the ability to:
1 Research and evaluate the creative and functional characteristics of technology and processes	<ul style="list-style-type: none"> • research and record examples of the creative and functional use of specific technologies and processes in the work of others • identify and record examples of the creative use of 3D technologies and processes
2 Experiment creatively with a range of technology and processes	<ul style="list-style-type: none"> • use a range of technology and processes • experiment creatively and extensively with technology and processes
3 Demonstrate the creative and functional use of technology and processes	<ul style="list-style-type: none"> • produce design work which explores the creative and functional potential of specific technologies and processes • produce design work which exploits the use of selected technologies and processes in achieving creative and functional results
4 Evaluate and analyse the results of technology and processes	<ul style="list-style-type: none"> • gather feedback from others in assessing the effects of specific technologies and processes • present an understanding of the aesthetic and functional effects of using 3D technologies and processes

Guidance

Delivery

An active experimental approach is required to encourage learners to broaden their understanding of the creative and utilitarian possibilities of the range of technology and processes available to the designer. The links between technology, processes and materials also require the learner to respect the workplace, the skills of specialists and the reasons for health and safety legislation.

This unit requires learners to experience the processes and technologies most directly related to their chosen 3D design specialism. It is important to recognise that the purpose of the unit is to expand the learner's awareness of the possibilities of technology and processes and their positive contribution to the creative process of design.

Learners should be encouraged to research and critically analyse the way in which others have used processes and technologies in 3D work. Research is developed through this unit in order to broaden the learner's understanding of the potential of design technology and processes to produce functional and aesthetic effects.

Learners are encouraged to experiment with using technology and processes and gain some awareness of a broad range while gaining detailed understanding of the processes associated with their chosen specialism.

Assessment

The work for this unit can result from work experience, a 'live' project undertaken under the direction of an outside agency or can be integrated within the learners chosen area by means of tasks specified in the project or assignment briefs. These may specify process and technology requirements to ensure appropriate depth and breadth of skills and understanding.

Analysis of others' work, outcome 1, and learners' own work, outcome 4, may be presented as written assignments in an appropriate format or presented to peer groups and/or tutors for discussion. Learners should be able to articulate their own thinking using appropriate language, through discussion and evaluation, demonstrating a broader understanding of materials and their potential in both creative work and in the production of functional and reliable products. The design work in outcome 3 can be presented in any suitable format.

Links

This unit parallels *Unit 3: Properties of 3D Materials* and is a prerequisite to optional units. It also provides essential underpinning skills and knowledge for optional units *Unit 16: Specialist 3D Materials*, *Unit 17: Specialist 3D Technology and Processes* and *Unit 18: Design and Function*.

This unit also links with the following units in the National Occupational Standards (NOS):

- Unit 32: Elements 1 and 2
- Unit 3D: Element 3.

Resources

This unit requires access to workshop facilities suitably equipped for 3D work with reference to a range of processes and associated technologies.

Suggested sources for research include the internet, CD-Roms, databases, specialist publications, galleries, exhibitions, questionnaires and interviews with practitioners.

Support materials

Books

Berger J — *Ways of Seeing* (Penguin Books and BBC, London, 1973)

Berger J — *About Looking* (Peter Smith Publications, 1992)

Gombrich E H — *Art and Illusion: A Study of the Psychology of Pictorial Representation* (Phaidon Press Limited, 1995)

Hoffman D — *Visual Intelligence — What We Create and What We See* (WW Norton & Company, 1998)

Unit 5: Critical Study

Learning hours: 60

NQF Level 5: BTEC Higher National – H2

Description of unit

This unit provides the learner with the knowledge, understanding and skills to define and research an historical context and relate it to the present. It also provides an opportunity for learners to evaluate these references in the context of their chosen specialism.

The aim of the unit is to provide the learner with an independent view of one area of design context that relates closely to their own work.

Summary of learning outcomes

To achieve this unit a learner must:

- 1 Analyse in depth and interpret the **historical evolution and visual characteristics** of the work of 3D designers
- 2 Analyse in depth and interpret specialist work through applying appropriate **methods of research and information retrieval**
- 3 Analyse in depth how **historical, contextual and contemporary practice** influences the learner's specialist pathway
- 4 Draw independent and insightful conclusions from others' **writings and critiques** about a range of 3D design work and present a personal view.

Content

1 Historical evolution and visual characteristics

Definitions: key movement, styles, influences, eg constructivism, futurism, De Stijl, Bauhaus

Chronology: sequence of key movements, styles, influences

Comparisons: between key artists, designers and/or craftspeople in chosen pathway

Influences: visual language, period style, eg ornament and decoration

Techniques, processes and interpretation: explored in developmental work, selected for final outcome

2 Methods of research and information retrieval

Sources: eg library research, reference systems and abstracting, electronic sources, museums, galleries, exhibitions, workshops, interviews and questionnaires

Methods: survey of relevant contemporary topics, ‘first-hand’ research

Extracting information: topic description, ‘first-hand’ research from practising professionals, related visual language and techniques, creative and cultural contexts, eg linked to movements, schools, style, ethnic influences

3 Historical, contextual and contemporary practice

Influences: on others’ work, social, economic, political events

Styles: of contemporary practice, eg ‘avant garde’, ‘cutting edge’

4 Writing and critiques

Drawing conclusions: eg comparative study, critical analysis, interpretations, quotations, conclusion, appraisal of findings

Personal view: opinions, arguments, style

Outcomes and assessment criteria

Outcomes	Assessment criteria for pass To achieve each outcome a learner must demonstrate the ability to:
1 Analyse in depth and interpret the historical evolution and visual characteristics of the work of 3D designers	<ul style="list-style-type: none"> • analyse in depth a range of techniques, processes, and visual language from examples of work produced in the context of their chosen specialism • interpret and make effective comments on the historic evolution and visual characteristics of the work of designers
2 Analyse in depth and interpret specialist work through applying appropriate methods of research and information retrieval	<ul style="list-style-type: none"> • identify and develop effective methods of research and information retrieval from paper sources and electronically • compile a wide-ranging personal record of contemporary criticism, illustration and references from journals, magazines and first hand research
3 Analyse in depth how historical, contextual and contemporary practice influences the learner's specialist pathway	<ul style="list-style-type: none"> • analyse the creative, cultural, social, political, and economic contexts which influence selected specialist work • make the connection between the analysis of contextual influences and the learner's own work
4 Draw independent and insightful conclusions from others' writings and critiques about a range of 3D design work and present a personal view	<ul style="list-style-type: none"> • compare historical and/or contemporary influences on the visual language used by the practitioners • explore a range of creative, cultural, social, political, economic contexts and draw independent conclusions • critically analyse and review findings

Guidance

Delivery

Learners will need to show a high level of personal initiative and enquiry to achieve the outcomes. Study should complement the learner's chosen vocational routes and lead to self-awareness from an historical perspective.

Formal delivery should concentrate on research and presentation skills followed by systematic seminar and tutorial sessions on a group or individual basis.

Assessment

Work should be presented as an extended written study which should integrate all historical and contextual referencing. This should be no less than 3500 words with appropriate supporting visual information. Illustrations could show how activities in learners' own vocational pathway are linked.

A 'file' which contains evidence of study skills and research methods should accompany an extended written study, to provide evidence for outcome 2.

Links

This unit is linked with *Unit 2: Historical and Contextual Referencing* which provides essential skills and understanding of research processes. However the emphasis is on developing and applying analytical skills to a topic related to the learner's chosen area of specialism/interest. This serves two purposes. Firstly the research provides useful source material relevant to design projects and secondly develops the learner's academic skills, knowledge, and understanding which will equip them for progression to further HE study or employment.

This unit also links with the following unit in the National Occupational Standards (NOS):

- Unit 3D: Elements 1.

Resources

Suggested sources for research include the internet, CD-Roms, books and periodicals.

Learners will need access to primary sources, such as local and national galleries, exhibitions, artists and designers studios/workshops. They will also need access to word processors, laser copiers and computer scanners to help prepare and present their study.

Support materials

Books

Strinati D — *An Introduction to the Theories of Modern Culture* (Routledge, 1995)

Walter J A — *Design History and the History of Design* (Photopress, 1989)

Unit 6: Professional Practice and Development

Learning hours: 60

NOF Level 5: BTEC Higher National – H2

Description of unit

This unit serves to draw together the various aspects of learners' work to provide evidence of a coherent and presentable portfolio of work which is of a standard acceptable to a commercial employer. Learners are expected to demonstrate a full understanding of their intended job role and its career potential.

Summary of learning outcomes

To achieve this unit a learner must:

- 1 Plan, monitor and evaluate a **series of projects** effectively
- 2 Understand and display **professional competence** consistently
- 3 Present an imaginative **portfolio of work** of a professional standard
- 4 Produce direct evidence of intended **career path** in 3D design.

Content

1 Series of projects

Live project: marketing information/research, collecting and collating data, costing, presentation format, client employing company (its market, product range, design and marketing strategies, product/job costing, influential factors)

2 Professional competence

Operational: time management, planning, evaluation and monitoring, commercial awareness

Professional standards: ethical considerations, environmental impact, legal restrictions/parameters, quality assurance systems, procedures, monitoring mechanisms

Design development and realisation: will vary according to the project but may include negotiation, design development, presentation drawings, working drawings

3 Portfolio of work

Organised: structure, clarity, prototyping

Supporting information: project focus and intentions, producing a final product, research findings, decision making, evaluation, future potential

Personal presentation skills: attitude, dress, manner, personal marketing, adjusting portfolio/personal presentation strategy to specific job interview requirements

4 Career path

Planning: action plans, decision trees, SWOT (Strengths, Weakness, Opportunities, Threats) analysis

Career direction: educational course(s), employment opportunities, business start-up

Outcomes and assessment criteria

Outcomes	Assessment criteria for pass To achieve each outcome a learner must demonstrate the ability to:
1 Plan, monitor and evaluate a series of projects effectively	<ul style="list-style-type: none"> • liaise with clients in order to plan projects effectively
2 Understand and display professional competence constantly	<ul style="list-style-type: none"> • apply operational and professional standards when working on and developing a live project
3 Present an imaginative portfolio of work of a professional standard	<ul style="list-style-type: none"> • apply professional standards in arranging, integrating and presenting work and supporting information • identify and apply personal presentation skill which contribute to success in pursuing profession aims
4 Produce direct evidence of intended career path in 3D design	<ul style="list-style-type: none"> • produce evidence for realistic short and long-term plans for own career direction • produce CV for a specific job role progression opportunity

Guidance

Delivery

Learners will need support and advice in structuring and desktop publishing their report.

Work for this unit should be developed through two routes:

- practical work undertaken as a project set in a professional context
- research into professional working practices and the learner's future career aspirations.

Practical work should be presented in a suitable format, and may vary depending on the specialism of the learner. Sketchbooks should be included in the portfolio and these should demonstrate an understanding of the area in which the learner is working.

Learners should gain enough professional experience to give them a good understanding of their intended specialist job area. Ideally this should be a live project monitored by an external agency to set standards for presentation format, timing and coverage. Professional experience should ideally equate to a minimum of six weeks of full-time study.

Assessment

The main focus of the unit is a live project which staff are likely to have to organise. However where possible the project can be undertaken as part of a work experience or through an opportunity that the learner identifies.

Links

This unit links to *Unit 7: Professional Studies* which explores the professional context and specialism.

This unit can also be integrated with specialist design units where understanding of professional practice will support the work.

This unit also links with the following unit in the National Occupational Standards (NOS):

- Unit 3M: Elements 1, 2, 3 and 4.

Resources

Learners will need access to a range of studio facilities and equipment suitable for a chosen specialism. They will need access to professional practitioners and expertise to enable them to research professional working practices and undertake live projects. Careers advice will be needed to complete aspects of outcome 4.

Learners will need access to desktop publishing to produce the report.

Support materials

Book

Evans D W — *People and Communication: Communication in Organisations* (Copp Clark Professional, 1983)

Other materials

Video Arts briefcase booklets and videos (for example *Meetings Bloody Meetings*)

Unit 7: Professional Studies

Learning hours: 60

NQF Level 5: BTEC Higher National – H2

Description of unit

This unit is intended to help learners relate practical studies in 3D design to a professional context. It deals with legislation affecting 3D designers and develops understanding of professional ethics and responsibilities. The unit requires learners to examine business organisations and to compare job roles of 3D designers working in different kinds of organisations. Learners are also expected to investigate the ethics and responsibilities of 3D designers in relation to society and the environment.

Summary of learning outcomes

To achieve this unit a learner must:

- 1 Investigate and understand **legislation** affecting 3D designers
- 2 Investigate and understand the **professional ethics and responsibilities** of 3D designers
- 3 Investigate and understand the **environmental ethics and social responsibilities** of 3D designers
- 4 Investigate and understand **business organisations and the job roles** of designers.

Content

1 Legislation

Regulations and legislation: eg copyright, designs and patents legislation, consumer protection legislation, equal opportunities legislation, Control of Substances Hazardous to Health regulations (COSHH), electricity at work regulations (portable appliance testing), health and safety (display screen equipment) regulations, Health and Safety at Work Act (1974)

Complications: eg concept of intellectual property; implications of new technologies with respect to copyright legislation

2 Professional ethics and responsibilities

Codes of ethics: personal, eg punctuality, honesty, integrity, conscientiousness, respect for others; corporate, eg professional bodies' codes of practice, company policies and charters

Professional responsibilities of designers: to their agents, sponsors, clients or employers, eg meeting deadlines, confidentiality, settling bills; to consumers and the general public, eg protection of consumers, avoidance of the public display or sale of discriminatory or offensive products, images or messages, supply of quality work

3 Environmental ethics and social responsibilities

The consumer society: eg use of style, image, durability and efficiency of products, culture, lifestyle, globalisation

The secular society: eg politics, economics, science, technology, socio-economic groups

Moral issues: eg religion, ethnic groups, poverty, gender, sexuality

The environment: eg 'green' issues, recycling, use of natural resources, sustainability

4 Business organisations and the job roles

Businesses and organisations in which designers work: types and purpose, structures of different types

Modes of employment: job roles of designers working at different levels in different types of businesses and organisations

Outcomes and assessment criteria

Outcomes	Assessment criteria for pass To achieve each outcome a learner must demonstrate the ability to:
1 Investigate and understand legislation affecting 3D designers	<ul style="list-style-type: none"> • identify and investigate the main areas of legislation • demonstrate a clear understanding of the effects of legislation on the work of designers
2 Investigate and understand the professional ethics and responsibilities of 3D designers	<ul style="list-style-type: none"> • investigate and show an understanding of codes of ethics developed by companies and professional bodies • develop and show a personal code of ethics
3 Investigate and understand the environmental ethics and social responsibilities of 3D designers	<ul style="list-style-type: none"> • investigate and understand some of the main aspects of society and the environment, which impact on the work of designers • investigate the social responsibilities of designers
4 Investigate and understand business organisations and the job roles of designers	<ul style="list-style-type: none"> • identify and understand the types and purposes of businesses and organisations in which designers work • describe the structures of different types of businesses and organisations in which designers work

Guidance

Delivery

To ensure theory is put into practice, parts of this unit can be delivered within those linked units that define each learner's discipline, by means of cross-unit assignments. Other aspects can be delivered through lectures, seminars, classroom teaching and directed independent study. The use of paper-based and electronic learning materials can effectively supplement more traditional forms of delivery.

Assessment

Most of the evidence for this unit can be presented as a file of notes, collated printed material, summarised case studies and personal commentary written by the learner. The file should be organised and indexed by outcomes and topics. The file should be presented to a professional standard using word processing or desktop publishing software for the origination of material.

Links

It is important that this unit is set firmly in the context of graphic design practice. The outcomes and content should be interpreted with reference to the particular discipline(s) so that the relevance to specific practice is clearly understood.

This unit also links with the following unit in the National Occupational Standards (NOS):

- Unit W: Elements 1, 2 and 3.

Resources

Suggested sources for research include the internet, CD-Roms, books and specialist publications. Learners should also have access to email.

Printed material relating to aspects of outcome 1 can be obtained from the Patent Office (www.patent.gov.uk).

For other outcomes, an eclectic range of texts should be available so that learners are exposed to as many different views and opinions as possible. This is particularly important for outcome 3.

Support materials

Books

Charter M — *Greener Marketing* (Greenleaf Publishing Limited, 1992)

Rogak L — *Starting Your Business* (Dorling Kindersley, 2001)

The Chase — *How a Design Agency Works* (Cheetah Books, 1993)

Specialist units

Unit 8: Design Method

Learning hours: 60

NQF Level 5: BTEC Higher National – H1

Description of unit

This unit develops in learners an analytical and methodical approach to the process of designing and developing products in a commercial context. This unit will help improve the learner's organisational and time management skills whilst developing the self-analytical faculties necessary for success in design practice.

Summary of learning outcomes

To achieve this unit a learner must:

- 1 Research and understand the phases of the **design development cycle**
- 2 Plan a **complex project** using the design development cycle
- 3 Develop an imaginative and innovative **product**
- 4 **Evaluate** the product and suggest possible improvements.

Content

1 Design development cycle

Brief: identify client requirements, identify problem, produce proposal

Research: materials, context, eg similar past solutions, other graphic designers

Develop: research the materials, research alternative solutions, produce model or prototype

Produce: finished solution, evaluation, improvement

2 Complex project

Project brief: identify problem, specification of acceptable limits of the solution

Research: competitive solutions, ideas, theoretical investigations, materials, processes, costs

Costs: improved efficiency, shortening development times, identifying times, identifying problems, testing alternative or cheaper materials, techniques or processes

3 Product

Designing: alternative solutions to the problem, identification of preferred solution(s), ideas generation, development, experimentation, selection, modification, completion

Making: development of roughs and visuals, testing of ideas, working designs

Designs: active testing for visual acceptability, function, completing solutions, analysis of results

4 Evaluate

Evaluation: test the design, measure performance against brief specification

Learners' own work: eg use of skills, self-analysis, time management, organisation, work, quality, work rate, teamwork, research, communication, effectiveness, employability, career development

Value to others: eg effectiveness, efficiency, quality of output, production, reproduction

Commercial context: eg design, practitioner, design-related organisation

Outcomes and assessment criteria

Outcomes	Assessment criteria for pass To achieve each outcome a learner must demonstrate the ability to:
1 Research and understand the phases of the design development cycle	<ul style="list-style-type: none"> • research the phases of design development cycle • identify the phases of design development in relation to design work in a commercial context • identify distinct stages of design development in relation to own work
2 Plan a complex project using the design development cycle	<ul style="list-style-type: none"> • investigate a complex problem and write an effective design brief to solve it • carry out thorough research and produce a range of design solutions
3 Develop an imaginative and innovative product	<ul style="list-style-type: none"> • make effective roughs and visuals • evaluate roughs and visuals against the requirements of the project
4 Evaluate the product and suggest possible improvements	<ul style="list-style-type: none"> • analyse and evaluate the effectiveness of the design development cycle in own work • analyse and evaluate the value of the design development cycle in a commercial context

Guidance

Delivery

An analytical approach is required to encourage learners to respond in written and visual terms to their own design work and also to the work of others. This may involve design research, interviews with clients, their employees, product users and design practitioners.

Learners are encouraged to research and critically analyse the effectiveness of the methods of working employed by themselves, design practitioners and design-related commercial organisations. The evidence for this may be in recorded, written and visual forms but must indicate an increasing level of objectivity in their response to the design and development process.

Assessment

The work for this unit can be integrated within the learner's chosen area of specialism.

Analysis of learners' own and others' work may be presented as written assignments in an appropriate format or may be presented to peer groups or tutors for discussion. Learners should be able to articulate their own thinking using appropriate language, through discussion and evaluation. Learners should demonstrate a broad understanding of design principles and their effects upon creative work and in the production of functional and reliable products.

Work demonstrating the use of the design cycle may be presented in any appropriate format, suited to the work.

Links

The work of this unit is central to the development of the employable skills acquired by the learner relating most directly to: *Unit 3: Properties of 3D Materials, Unit 4: 3D Technology and Processes, Unit 6: Professional Practice and Development, Unit 7: Professional Studies and Unit 18: Design and Function.*

This unit also links with the following units in the National Occupational Standards (NOS):

- Unit 31: Elements 1, 2 and 3
- Unit 33: Elements 1, 2 and 3
- Unit 34: Element 1
- Unit 3R: Elements 1 and 2.

Resources

This unit requires access to a workshop equipped to permit work in the learner's area of design specialism.

Suggested sources for research include the library, the internet, CD-Roms, databases, specialist publications, galleries, exhibitions, questionnaires and interviews with practitioners.

Support materials

Books

McDermott C — *Essential Design* (Bloomsbury, 1992)

Whiteley N — *Design for Society* (Reaktion Books, London, 1993)

Unit 9: Computer Applications in Art and Design

Learning hours: 60

NOF Level 5: BTEC Higher National – H1

Description of unit

The aim of this unit is to introduce learners to the creative potential of the computer in the context of 2D design. It will provide the opportunity to explore software and its relevance to the area of study. It aims to provide an overview of a variety of painting, drawing, typographic and desktop publishing software. It encourages combinations of traditional and digital design practices, leading to innovative presentations.

Summary of learning outcomes

To achieve this unit a learner must:

- 1 Use a range of **painting and drawing software applications** effectively and creatively
- 2 Digitise and **manipulate objects or images** effectively and creatively
- 3 Use **typographic design** applications effectively and creatively
- 4 Use **desktop publishing and text editing** software applications effectively and creatively.

Content

1 **Painting and drawing software applications**

Drawing software: eg illustration applications (vector graphics), painting applications (bitmap graphics)

Drawing devices: eg digitising tablet, pressure sensitive stylus, mouse, touch-screen

2 **Manipulate objects or images**

Software applications: eg any software which will have features like distortion, adjust colour range, contrast, palettes and a range of tools with which to paint and adjust image files

Digitise: eg digital photography, scan

Objects: eg found objects, natural objects, domestic tools

Image: eg photographs, found images, own visual work, hand-written text, word-processed text

3 **Typographic design**

Font design software: any software that will enable experimentation with Bitmap fonts, Postscript fonts, TrueType and TrueDoc fonts

Typographic design software: any software that will enable learners to experiment with fonts and font design using a range of tools

4 **Desktop publishing and text editing**

Text editing software: proprietary word processing application with automated routines eg word count, spell checker, grammar checker, formatting styles, font styles, headers and footers

Outcomes and assessment criteria

Outcomes	Assessment criteria for pass To achieve each outcome a learner must demonstrate the ability to:
1 Use a range of painting and drawing software applications effectively and creatively	<ul style="list-style-type: none"> • use painting software applications effectively and creatively to present a range of work • use drawing software applications effectively and creatively to present a range of work
2 Digitise and manipulate objects or images effectively and creatively	<ul style="list-style-type: none"> • digitise and manipulate a range of objects in an appropriate file format effectively and creatively • digitise and manipulate a range of images in an appropriate file format effectively and creatively
3 Use typographic design applications effectively and creatively	<ul style="list-style-type: none"> • use a range of typographic design applications effectively and creatively • produce a range of work showing the creative use of typography
4 Use desktop publishing and text editing software applications effectively and creatively	<ul style="list-style-type: none"> • use desktop publishing software effectively and creatively • use text editing software applications effectively and creatively • prepare image, graphic and text files for use in page layout and publicity material

Guidance

Delivery

An active experimental approach is required to encourage learners to broaden their creativity. Use demonstrations of software applications, research methods and health and safety practices as an introduction to the unit.

Research is a basic skill that will be developed through this unit in order to broaden their creative outlook. Learners should record sources accurately; citing authors, titles of books, articles, journals and publications, date of publication, place of publication and country of publication.

The range of devices and software mentioned is not exhaustive and learners are encouraged to research beyond design applications to gain a broader view of computer use.

The aim is to ensure that design learners are familiar with a wide range of essential technology.

Assessment

The following examples of evidence are suggestions. This unit offers an opportunity for experimentation with raster/vector and bitmap graphics. Evidence for this might be a range of work produced using a painting application and a range of work produced using a drawing programme. File size and format should be considered particularly if the files are to be developed further. The focus of this unit is on 2D applications and encourages learners to look at the inter-relationships between typography, design and image. Outcome 3 enables learners to assemble and produce a desktop published document using the new skills acquired from outcomes 1 and 2. Evidence for this might be an artefact like a newsletter or an innovative curriculum vitae.

Links

This unit aims to give learners a broad introduction to 3D digital design applications.

This unit also links with the following units in the National Occupational Standards (NOS):

- Unit 32: Elements 2 and 3
- Unit 3D: Element 1
- Unit W: Element 3.

Resources

This unit requires access to workshop facilities suitably equipped for 3D work with reference to a range of processes and associated technologies.

Suggested sources for research include the internet, CD-Roms, databases, specialist publications, galleries, exhibitions, questionnaires and interviews with practitioners. Appropriate software manuals will also be useful.

Learners will need access to sources for identifying current examples of digital design and imaging. Suggested sources include: the library, the internet, CD-Roms, databases, specialist publications, galleries, exhibitions, questionnaires and interviews with practitioners.

Support materials

Books

Druckry T and Stone A R (Editors) — *Electronic Culture: Technology and Visual Representation* (Aperture, 1997)

Heller S and Drennan D — *The Digital Designer: The Graphics Arts Guide to New Media* (Watson-Guptill Publications)

Popper F — *Art of the Electronic Age* (Thames & Hudson, 1997)

Remediation — *Understanding New Media* (The MIT Press, 2001)

Websites

www.adobe.com/products/adobemag/pastissues *Adobe Magazine Online Archive*

www.commarts.com *Communication Arts*

www.computerarts.co.uk *Computer Arts Magazine*

www.dgusa-europe.co.uk *Dynamic Graphics Magazine*

www.mad.co.uk *Creative Review*

Unit 10: Design Principles

Learning hours: 60

NQF Level 5: BTEC Higher National – H1

Description of unit

In this unit learners will develop an understanding of how attitudes of designers influence the appearance and function of graphics products. These attitudes involve the ethics of commerce, and the changing values of society which determine the context within which the graphic designer operates.

The unit establishes principles and encourages learners to develop their own distinctive approach to design. Work produced for this unit should be in the learners' chosen design specialism.

Summary of learning outcomes

To achieve this unit a learner must:

- 1 Analyse, evaluate and apply the principle that **form follows function**
- 2 Analyse, evaluate and practically explore the **appropriateness of materials**
- 3 Analyse, evaluate and apply the principle of **cultural association**
- 4 Analyse, evaluate and apply the principle of **design for need**.

Content

1 **Form follows function**

Function: symbolic, utilitarian, protection, communication, transportation, entertainment, commemoration, extension and development of human physical capability

Form: 3D, symmetrical, asymmetrical, regular, irregular, geometric, spatial arrangements

2 **Appropriateness of materials**

Material use: eg aesthetic, protective, decorative, as camouflage

Appropriateness: eg material used for purpose to which it is best suited in terms of colour, surface, pattern, function

3 **Cultural association**

Visual images: eg symbols, signs, colour, arrangements which have strong association with cultural, religious or political movements, motifs, typography, products, decoration

Style: eg historical, contemporary

Symbolic value: eg quality, class, wealth, exclusivity, fame, desirability

Aesthetic values: eg of individual users, of groups, of target markets

4 **Design for need**

User needs: safe, useful, performs to advertised specification, quality, value for money, physical, communication, labour saving, life prolonging, life saving, inspiring, pleasing, humorous

Community and environmental: purpose, hazardous to life, improve the visual quality of the manufactured world, reduce threat to the environment, use recyclable, non-hazardous materials and processes, minimise waste, reduce pollution

Outcomes and assessment criteria

Outcomes	Assessment criteria for pass To achieve each outcome a learner must demonstrate the ability to:
1 Analyse, evaluate and apply the principle that form follows function	<ul style="list-style-type: none"> • analyse a design brief and identify the principal functional requirements • produce a functional design of minimal form, detail and surface decoration • relate appearance to purpose
2 Analyse, evaluate and practically explore the appropriateness of materials	<ul style="list-style-type: none"> • select a range of materials for a variety of uses and evaluate their appropriateness • identify the dominant physical, visual and tactile characteristics of materials • exploit physical, visual and tactile qualities of materials
3 Analyse, evaluate and apply the principle of cultural association	<ul style="list-style-type: none"> • identify the visual language and/or style required by the client/user within the design brief • incorporate visual effects and forms which reflect the aesthetic values and requirements of the client • use the visual language required as specified in the design brief
4 Analyse, evaluate and apply the principle of design for need	<ul style="list-style-type: none"> • identify the user needs which the design is to satisfy • produce work which meets the user needs • display a responsibility to the wider community in approach to designing, making and constructing

Guidance

Delivery

An active experimental approach is required to encourage learners to respond in written, visual and 3D ways to their research into the application of design principles. Learners are encouraged to research and critically analyse the way in which others have addressed design principles in 3D work.

Learners are encouraged to investigate the use of materials, forms and surfaces, in distinct and different ways. The purpose and effect of the designs should be viewed within the wider context.

Assessment

The work for this unit should be integrated into the learner's chosen area of specialist work. Tasks specified within the project briefs require an examination of design principles and to be accompanied by specific assessment requirements.

Analysis of learners' and others' work can be presented in a written or annotated visual format or may be presented to peer groups and/or tutors for discussion. Learners should be able to articulate their thoughts using appropriate language, through discussion and evaluation. They should be able to demonstrate a broader understanding of design principles and the effects on creative work and in the production of functional and reliable products.

Demonstration of the practical application of principles can be presented in any appropriate format.

Links

This unit links to any of the practical units, particularly as one that forms part of a multi-unit vocationally-focused assignment.

Links can be made with *Unit 8: Design Method*.

This unit also links with the following units in the National Occupational Standards (NOS):

- Unit 31: Elements 1 and 2
- Unit 32: Elements 1 and 2
- Unit 3P: Element 1.

Resources

This unit requires access to workshop facilities suitably equipped for work in wood, metal and plastics. It should include a finishing area with spray booth, compressor, dip coating facilities, a multi-purpose sculpture area. There should also be a hot area for soldering, forging, welding and brazing of metals.

Suggested sources for research include the library, the internet, CD-Roms, databases, specialist publications, galleries, exhibitions, questionnaires and interviews with practitioners.

Support materials

Books

Fishel C — *The Perfect Package* (Rockport Publishers, 2001)

Mason D (Editor) — *Experimental Packaging* (RotoVision, 2001)

Sonsino S — *Packing Design, Graphics Materials and Technology* (Thames & Hudson, London, 1990)

Unit 11: 3D Animated Products

Learning hours: 60

NOF Level 5: BTEC Higher National – H1

Description of unit

In this unit learners will investigate the design and production of 3D animated products. The unit focuses on applying and developing design skills to a range of products which incorporate movement. These will be combined with the skills and knowledge of the materials and techniques necessary for controlling and effecting movement. Safety and reliability issues will also be addressed.

The unit deals specifically with the design, construction and control of real-time animated devices such as puppets, marionettes, automata, toys, kinetic art objects and point of sale devices. The unit is intended to develop visual, theoretical and practical skills relating to design, and would be of value to specialists in commercial model making, design for performance, exhibition and retail design, and product design.

Summary of learning outcomes

To achieve this unit a learner must:

- 1 Research and evaluate **animated products**
- 2 Develop and design an animated product using **technological principles**
- 3 Make imaginative **models and prototypes** of animated products
- 4 **Evaluate** models and prototypes in terms of meeting the needs of the end user and managing the project effectively.

Content

1 **Animated products**

Types of animated product: interactive, independently controlled, automatic

Contexts of use: theatrical, circus, satire, political, comedy, television

Audience: adults, children

2 **Technological principles**

Mechanics: springs, elastic materials, gravity

Mechanical devices: levers, springs, cams, pulley systems, gear systems

Movement: rotary, oscillating, reciprocating, angular, rapid, slow, repetitive, oscillating, animal, human, insect

Technology: electronic, hydraulic, pneumatic

Control: interactive, manual, remote, timed, mechanically or electronically sequenced

3 **Models and prototypes**

Precision: component fit, movement, reliability

Processes: cutting, removing, redistributing, joining, assembling, finishing

Quality: finish, component fit, reliability, safety

Safety: processes, in operation

4 **Evaluate**

Project management: scheduling, research, making development, refining stages, time management, sub-contracted work

Cost: materials, processes, job time, fixed overheads, competing products, defined limits

Job roles: visual effects designer, mechatronics engineer, electrical/electronics engineer, systems engineer, project engineer, accountant, puppeteer, theatrical designer

Co-ordination of project: teams of specialists, project manager, stages — design, prototype, testing

Outcomes and assessment criteria

Outcomes	Assessment criteria for pass To achieve each outcome a learner must demonstrate the ability to:
1 Research, and evaluate animated products	<ul style="list-style-type: none"> • research use of real-time animated products • identify visual characteristics and features which are enhanced by movement • research and explore surface qualities, movement and motion to produce designs
2 Develop and design an animated product using technological principles	<ul style="list-style-type: none"> • apply mechanical design principles to achieve desired movements • use technology and processes to control movements
3 Make imaginative models and prototypes of animated products	<ul style="list-style-type: none"> • use materials and processes to achieve effect of movement • display an analytical approach to the process of making and developing • comply with safe working practises in the construction and operation of real-time animated products • produce visually imaginative results
4 Evaluate models and prototypes in terms of meeting the needs of the end user and managing the project effectively	<ul style="list-style-type: none"> • evaluate 3D animated products created • produce evidence of effective project planning and time management • accurately estimate costs of production

Guidance

Delivery

An active experimental approach is required to encourage learners to broaden their understanding of the creative and utilitarian possibilities offered by the range of technology and processes available to the designer of animated products. As it is a focal point for a career pathway, much of the work for this unit could be accumulated within the context of work experience.

Assessment

All evidence should be presented to a professional standard showing 2D and 3D work, arranged to emphasise the range of skills required to create 3D real-time animated outcomes.

Links

This unit focuses learners' attention on a specific career direction and therefore relates directly to all units which comprise the Higher National in 3D Design, reinforcing the skills and knowledge acquired at H1. It links with the following units: *Unit 5: Critical Study*, *Unit 6: Professional Practice and Development*, *Unit 10: Design Principles*, *Unit 16: Specialist 3D Materials*, *Unit 17: Specialist 3D Technology and Processes*, *Unit 18: Design and Function* and *Unit 20: Marketing*.

The unit also offers a point of contact with both engineering and manufacturing disciplines and links with the following units in the National Occupational Standards (NOS):

- Unit 31: Elements 1, 2 and 3
- Unit 32: Element 2
- Unit 3D: Elements 1 and 3.

Resources

This unit requires access to a range of specialist workshop facilities for the development of models and prototypes. This should include: photographic processing facilities, a suitably equipped workshop, a finishing area, a multi-purpose sculpture area and a hot area permitting forging, welding and brazing of metals.

Suggested sources for research include the library, the internet, CD-Roms, databases, publications, galleries, exhibitions, questionnaires and interviews with practitioners. Learners should record sources carefully and accurately citing authors, titles of books, articles, journals and publications, date, place and country of publication.

Support materials

Books

Brieron T — *Stop-motion Puppet Sculpting* (McFarland, 2004)

Fraser P — *Puppets and Puppetry* (Random House, 1986)

Unit 12: Product Design

Learning hours: 60

NOF Level 5: BTEC Higher National – H1

Description of unit

This unit provides a focal point for learners who intend to follow careers associated with the manufacturing of products and furniture design.

The unit develops skills and knowledge in the visual attributes of manufactured products and the materials from which they are made. Consideration of the manufacturing processes and the functional characteristics of products include ergonomics, reliability and safety. The relationship between product design and marketing will also be examined.

Summary of learning outcomes

To achieve this unit a learner must:

- 1 **Research, plan and design** the product creatively and effectively
- 2 Apply knowledge of **technological principles** in the design of the product effectively
- 3 Demonstrate effective **use of technology** in producing imaginative models and prototypes
- 4 Display a thorough working knowledge of the **organisation and management** of design manufacturing.

Content

1 Research, plan and design

Types of product: functional, decorative, consumer durables, packaging graphic design advertising

Marketing: sectors, strategies, product cost, quality, product features

Communication techniques: use of appropriate visual language and drawing conventions, eg freehand and orthographic drawings, standard conventions (BS308)); lens-based methods, eg photography, image manipulation, CAD software, digital photography and presentation, methods of illustrations, photographs, models

Legal requirements: consumer protection legislation, design protection, Health and Safety at Work Act, national and international standards for product performance

2 Technological principles

Brief: given by others, self-generated project

Mechanics: energy storage, transmission

Structures: systems, eg geodesic, space structures, stressed skin, tensegrity; features, eg struts, ties, beams, loads, reaction, triangulation, tension, compression, torsion; types, eg flexible, rigid

Materials: types, features, qualities

Production processes: one-off, small-scale, large-scale

3 Use of technology

Processes: cutting, removing, redistributing, joining, assembling, finishing

Safety: during production, in operation

Quality: finish, reliability, safety, precision (component fit, movement, reliability)

4 Organisation and management

Project management: scheduling, research, making development, refining stages, time management, sub-contracted work

Cost: competing products, within defined limits

Job roles: designer, mechanical engineer, electrical/electronics engineer, production engineer, systems engineer, project engineer, accountant

Co-ordination of project: teams of specialists, project manager (design, prototype, testing stages), quality control

Outcomes and assessment criteria

Outcomes	Assessment criteria for pass To achieve each outcome a learner must demonstrate the ability to:
1 Research, plan and design the product creatively and effectively	<ul style="list-style-type: none"> • explore appearance, surface qualities, form and function to achieve effective product design • show how market research can influence the design of products • communicate understanding of the influence of legal requirements and associated standards on product design and function
2 Apply knowledge of technological principles in the design of the product effectively	<ul style="list-style-type: none"> • apply mechanical and structural design principles to achieve requirements of the product design brief • show how choice of materials and production considerations can influence the appearance of a product • ensure that the designed products comply with safe working practices
3 Demonstrate effective use of technology in producing imaginative models and prototypes	<ul style="list-style-type: none"> • select and make effective use of materials in constructing models, products and prototypes • use effective and safe processes in making quality models, products and prototypes • use finishing techniques to produce effective visual results in models and prototypes
4 Display a working knowledge of the organisation and management of design and manufacturing	<ul style="list-style-type: none"> • produce evidence of project planning and time management in relation to the design of products • accurately estimate costs of designed products • produce evidence of the job roles and co-ordination of project work within the product design environment

Guidance

Delivery

An active experimental approach is required to encourage learners to broaden their understanding of the creative and utilitarian aspects of product design. This can best be reinforced by direct contact and discussion, and much of the work for the unit could be accumulated within the context of work experience.

Assessment

All evidence should be presented to a professional standard showing 2D and 3D work arranged to emphasise to best advantage the range of skills required for product design.

Links

This unit focuses learners' attention on a specific career direction and therefore relates directly to all units which comprise the Higher National Certificate/Diploma in 3D Design. It reinforces the skills and knowledge acquired at H1 level and links specifically with the following units: *Unit 5: Critical Study, Unit 6: Professional Practice and Development, Unit 10: Design Principles, Unit 16: Specialist 3D Materials, Unit 17: Specialist 3D Technology and Processes, Unit 18: Design and Function and Unit 20: Marketing.*

The unit deals with the design and production of manufactured products and is therefore relevant to specialists in other areas such as commercial model making, real-time animation and exhibition and retail. The unit also offers a point of contact with both engineering and manufacturing disciplines.

This unit also links with the following units in the National Occupational Standards (NOS):

- Unit 31: Elements 1, 2 and 3
- Unit 32: Element 2
- Unit 3M: Elements 1, 2 and 3.

Resources

This unit requires access to a range of specialist workshop facilities for the development of models and prototypes. This should include: photographic processing facilities, a suitably equipped workshop, a finishing area, a multi-purpose sculpture area and a hot area for the forging, welding and brazing of metals.

Suggested sources for research include the library, the internet, CD-Roms, databases, publications, galleries, exhibitions, questionnaires and interviews with practitioners. Learners should record sources carefully and accurately citing authors, titles of books, articles, journals and publications, date of publication, place of publication and country of publication.

Support materials

Books

- Booth-Clibborn E (Editor) — *Best of British Packaging* (Booth-Clibborn Editions, 1990)
- Cranz G — *The Chair: Rethinking Culture, Body and Design* (WW Norton & Company, 2000)
- Dennison E — *Packaging Prototypes 3: Thinking Green* (RotoVison, 2001)
- Fiell C — *1000 Chairs* (Taschen, 2000)
- Fiell C — *Modern Furniture Classics* (Thames & Hudson, 2001)
- Fishel C — *The Perfect Package* (Rockport Publishers, 2001)
- Heigston P — *Starting Your Business* (Dorling Kindersley, 2001)
- Mason D (Editor) — *Experimental Packaging* (RotoVision, 2001)
- Rogak L — *Smart Guides to Starting a Small Business* (John Wiley & Sons, 1999)
- Sembach K — *Furniture Design* (Taschen, 2002)
- Sonsino S — *Packing Design, Graphics Materials and Technology* (Thames & Hudson, London, 1990)

Unit 13: Commercial Model Making

Learning hours: 60

NQF Level 5: BTEC Higher National – H2

Description of unit

This unit develops the skills and understanding of learners who intend to follow careers as model makers in the architectural, media or entertainment industries. The unit is relevant to specialist areas in which 3D visualisation is important. It aims to develop practical and perceptual skills and gives opportunities to develop creative and communications skills.

Summary of learning outcomes

To achieve this unit a learner must:

- 1 **Research, plan and design** a model for commercial production creatively and effectively
- 2 Apply knowledge of **technological principles** in the design and function of the model effectively
- 3 **Make models** which are visually effective, functionally sound and cost-effective
- 4 Display a thorough knowledge of the **organisation and management** of the process of model making.

Content

1 **Research, plan and design**

Function: communicating ideas, forms, purposes, events, advertising, prototype, film, theatre, video, television

Situation: physical limitations, size, scale, purpose

Techniques: visual language, drawing conventions, 2D, 3D, lens based, CAD

Materials: wood, metal, plastics, fabrics, modelling materials, ceramics, hybrids, 'smart' materials

2 **Technological principles**

Materials: types, features, qualities, cost, availability

Structures: systems, eg geodesic, space structures, stressed skin, tensegrity; features, eg struts, ties, beams, loads, reaction, triangulation, tension, compression, torsion; types, eg flexible, rigid

Technology: mechanics, control, power sources, CAD, CAM, CNC

3 **Make models**

Effects: scale, size, static, moving, accuracy, realism, communicating ideas, quality

Precision: component fit, movement, reliability

Processes: cutting material, removing material, redistributing material, joining, assembling, finishing

Safety: of construction processes, in operation

4 **Organisation and management**

Project management: scheduling, research, making development, refining stages, time management, sub-contracted work

Cost: competing products, within defined limits

Job roles: designer, mechanical engineer, electrical/electronics engineer, production engineer, systems engineer, project engineer, accountant, architect, town planner, civil engineer

Co-ordination of project: teams of specialists, project manager, stages — design, prototype, testing

Outcomes and assessment criteria

Outcomes	Assessment criteria for pass To achieve each outcome a learner must demonstrate the ability to:
1 Research, plan and design a model for commercial production creatively and effectively	<ul style="list-style-type: none"> • research the commercial use of models • identify an appropriate scale for the model in relation to its function • use techniques to explore approaches to making the model and to develop and visualise designs • experiment with materials, appearance, surface qualities, form and function to achieve accurate and effective models
2 Apply knowledge of technological principles in the design and function of the model effectively	<ul style="list-style-type: none"> • specify appropriate materials in terms of cost, effectiveness and availability • apply structural design principles to produce safe and effective models • use technology effectively in creating 3D space and structures in models • accommodate restrictions imposed by available facilities, materials and resources on the design and making of models
3 Make models which are visually effective, functionally sound and cost effective	<ul style="list-style-type: none"> • produce accurate scale models to achieve intended effects • use processes in constructing skilfully accurate and visually interesting models • use finishing techniques to produce visual results in models • ensure that processes used comply with safe working practices
4 Display a working knowledge of the organisation and management of the process of model making	<ul style="list-style-type: none"> • produce evidence of effective project planning and time management in relation to commercial model making • accurately estimate costs of designed models • produce evidence of the job roles and co-ordination of project work within the commercial model-making environment

Guidance

Delivery

An active experimental approach will encourage learners to broaden their understanding of the creative possibilities offered by the range of technology and processes available to the model maker. As this unit is a focal point for a career pathway, much of the work for this unit is likely to be accumulated within the context of work experience.

Work produced in the unit should help learners develop a central core of employable skills which relate to existing specialisms in the commercial world.

Assessment

The work for this unit can be integrated into the learner's chosen area of specialist work by including in project briefs tasks which specify design requirements and which are accompanied by assessment criteria.

All evidence should be presented to a professional standard and should include a folio of 2D and 3D work which is arranged to emphasise the range of model making skills. It is intended that the learner will specialise in this unit and work in one of the following sub-specialisms: product model making, architectural model making or media/effects model making. The commercial model making could be applied in the context of the construction, engineering, manufacturing and media industries. The unit would be of value to specialists in interior, environmental, product or exhibition and retail design, and also real-time animation.

Links

The unit focuses learners' attention on a specific career direction and therefore relates directly to all units which comprise the Higher National Certificate/Diploma in 3D Design. The unit will reinforce the skills and knowledge acquired at H1 level and links with the following units: *Unit 5: Critical Study*, *Unit 6: Professional Practice and Development*, *Unit 10: Design Principles*, *Unit 16: Specialist 3D Materials*, *Unit 17: Specialist 3D Technology and Processes*, *Unit 18: Design and Function* and *Unit 20: Marketing*.

This unit also links with the following units in the National Occupational Standards (NOS):

- Unit 31: Elements 1, 2 and 3
- Unit 32: Element 2
- Unit 3M: Elements 1, 2 and 3.

Resources

This unit requires learners to have access to a broad range of specialist 2D and 3D facilities and equipment, and good storage options for design work and 3D work at different stages of design and production. This should include access to design tools, technology (fax, telephone, photocopier), current software, photographic studio and processing facilities, sculpture and metal working and 3D finishing areas. Learners will need access to other research resources such as the library, the internet, exhibitions and specialist books and journals. Learners should record all sources and references carefully.

Support materials

Books

Heigston P — *Starting Your Business* (Dorling Kindersley, 2001)

Midgley B — *The Complete Guide to Sculpture, Modelling and Ceramics* (Grange Books plc, 1997)

Rogak L — *Smart Guides to Starting a Small Business* (John Wiley & Sons, 1999)

Sutherland M — *Modelmaking: A Basic Guide* (WW Norton and Company, 1999)

Unit 14: Furniture Design

Learning hours: 60

NOF Level 5: BTEC Higher National – H2

Description of unit

In this unit learners will gain a knowledge and understanding of the visual and functional qualities of furniture and how it is designed. They will develop an understanding of a range of materials and select appropriate manufacturing processes in exploring construction and fabrication used in furniture design. They will develop high-level competence in controlling the creative process from inception to realisation.

Learners will be expected to develop an understanding of the role and responsibilities of the designer/maker in a commercial context, including one-off, batch and mass production, and to develop the ability to communicate 3D ideas through 2D drawing techniques and 3D making, modelling and prototyping skills.

Summary of learning outcomes

To achieve this unit a learner must:

- 1 Research and demonstrate a thorough knowledge of the **visual, tactile and functional characteristics** of furniture and related products
- 2 Research and develop an understanding of **structures, materials and making processes** to meet design requirements
- 3 Demonstrate effective skills in **design development**, using appropriate techniques to communicate ideas and respond to identified needs
- 4 Demonstrate a thorough knowledge of **professional practice**, including contractual and health and safety issues.

Content

1 Visual, tactile and functional characteristics

Aesthetic characteristics: appearance, formal elements, materials, techniques, processes, details, finishes, treatments, cultural significance

Creative potential: preparation of materials, selection, manipulation, fabrication, treatment, processes and finishes, determination of appearance, traditional and non-traditional materials and processes

Functional characteristics: strengths, weaknesses and limitations of materials and their application, principle of form related to function, ergonomics, construction methods, durability, finishes eg protective, decorative, tactile

2 Structures, materials and making processes

Properties and characteristics: structural strengths, rigidity, malleability, flexibility, maintenance, protective and decorative finishes

Processes and methods: hand and machine making, relevant to the chosen materials

Materials: plastics, wood, wicker, upholstery, metals etc, traditional and modern

Response to briefs: clarification, analysis, interpretation, possible solutions, initial proposals

3 Design development

Research: identification of information, selection, interpretation, historical, contemporary, cultural, market research, ergonomic, ethical and environmental issues

Ideas generation: research, initial responses, developmental and experimental work, working drawings, models

Making: maquettes, models, experimental constructions, prototypes, testing materials and structures, and completing the production process

Presentation: communication of ideas through — drawings, photographs, audio-visual presentations, folio, display, exhibition, publications for example

Identified needs: self, client, market

Working within a team: leadership, membership, communication, consultation, ideas generation, presentation

4 Professional practice

Business skills: time management, budget control, control of making/manufacturing process, client/customer relations, contracts, communication

Presentation, marketing and promotion: alternative methods, market information and analysis, clients' needs, consumer needs

Legislation: public liability, indemnity insurance, British/EEC standards, contractual obligations, copyright, health and safety

Ethical and environmental considerations: ecological, economic, elimination of waste, durability, relationship to environment, public welfare, consumer interests

Outcomes and assessment criteria

Outcomes	Assessment criteria for pass To achieve each outcome a learner must demonstrate the ability to:
1 Research and demonstrate a thorough knowledge of the visual, tactile and functional characteristics of furniture and related products	<ul style="list-style-type: none"> • research and record specific ideas and select materials appropriate to intended purpose • understand the visual and functional factors which influence outcomes
2 Research and develop an understanding of structures, materials and making processes to meet design requirements	<ul style="list-style-type: none"> • use the properties and characteristics of materials and techniques to create effective solutions to design briefs • use appropriate forming, constructing and finishing process methods to meet design requirements
3 Demonstrate effective skills in design development , using appropriate techniques to communicate ideas and respond to identified needs	<ul style="list-style-type: none"> • carry out research to obtain information relevant to design development • explore design solutions through drawing, sampling, model making and test rigs • produce working drawings, visuals, scale models and prototypes • prepare effective presentations of proposed design solutions • work within a team to produce design solutions
4 Demonstrate an understanding of professional practice , including contractual and health and safety issues	<ul style="list-style-type: none"> • operate effectively within a professional context • present, promote and market products • work safely and with due regard to the health and safety of others, observing contractual obligations and relevant legislation, ethical and environmental considerations

Guidance

Delivery

It is important that learners gain a thorough understanding of contemporary professional practice, and work at this level should include as much work experience as possible. The aim is for learners to attain appropriate professional skills and attitudes to work within a commercial context. Where work experience is difficult to arrange, simulated experiences should be as realistic as possible. Links within the centre and with outside agencies, particularly with professional practitioners to develop work experience and visits, would be beneficial. Arranging visits to professional studios, workshops and appropriate industrial sites is an important addition to work experience.

Assessment

In planning their own work, learners should work systematically and efficiently and make records of their progress. To develop design and making skills, learners need to carry out integrated research, to analyse the brief, prepare initial ideas, undertake market research, investigate and experiment practically with materials, processes and techniques. Learners will need to explore the visual and tactile properties of materials and investigate contexts and design development needs to demonstrate that they can select and interpret research information. This will require practical first-hand experience in manipulating materials to meet the requirements of briefs.

It is important that learners demonstrate a level of practical competence, combined with an awareness of relevant health and safety practices and legislation. Records of professional practice should be kept by the learner.

In practical and theoretical work learners should develop an expanding vocabulary of correct terminology in relation to furniture design.

Links

This unit provides opportunities to link with other disciplines, especially design crafts such as light metals, glass, ceramics and wood; also environmental design, exhibitions and retail design. Sculpture is another link within the fine art pathway.

This unit relates directly to *Unit 3: Properties of 3D Materials*, *Unit 4: 3D Technology and Processes*, *Unit 5: Critical Study*, *Unit 8: Design Method*, *Unit 10: Design Principles*, *Unit 16: Specialist 3D Materials* and *Unit 17: Specialist 3D Technology and Processes*.

This unit also links with the following units in the National Occupational Standards (NOS):

- Unit 31: Elements 1, 2 and 3
- Unit 32: Elements 1, 2 and 3
- Unit 3M: Elements 1, 2 and 3
- Unit W: Elements 2 and 3.

Resources

It is essential that adequate resources are available for handling a variety of materials used by the furniture designer. These should include specialist workshop(s) for wood and metal work, with appropriate machinery and equipment for converting materials, fabrication and assembly. Where possible access to equipment for handling other materials such as plastics, plaster and clay would be of benefit. A separate dust-free zone equipped with extractors would be required for spray finishing; computer-assisted-design programmes (if possible 3D modelling programmes) and reference collections will also be needed. Workshops and equipment must follow appropriate health and safety guidelines.

Support materials

Books

Cranz G — *The Chair: Rethinking Culture, Body and Design* (WW Norton and Company, 2000)

Fiell C — *1000 Chairs* (Taschen, 2000)

Fiell C — *Modern Furniture Classics* (Thames & Hudson, 2001)

Heigston P — *Starting Your Business* (Dorling Kindersley, 2001)

Rogak L — *Smart Guides to Starting a Small Business* (John Wiley & Sons, 1999)

Sembach K — *Furniture Design* (Taschen, 2002)

Unit 15: Design for Performance

Learning hours: 60

NQF Level 5: BTEC Higher National – H2

Description of unit

This unit provides a focal point for applying the skills and understanding acquired by learners who intend following careers as set designers, costume and visual effects designers in the entertainment industry. These roles bring them into close proximity with performance and learners will need to understand the particular operational characteristics of live theatre, film, television and video production. The unit emphasises versatility but expects learners to have a particular specialism in one of the following: set design and construction, costume design and construction, visual effects design and construction.

Summary of learning outcomes

To achieve this unit a learner must:

- 1 Use a wide range of sources to **create designs** from which costumes, props and sets can be made
- 2 Produce creative and effective **workable designs** for costumes, properties and sets from which others can produce the designs
- 3 Make effective and imaginative **models and full-size constructions** for costumes, props and sets
- 4 Display a thorough knowledge of the **organisation and management** of the performance environment.

Content

1 Create designs

Sources: script, prose, poetry

Distinctive characteristics: physical features, roles, historical period, political, religious and cultural groupings, materials, finishes

Research: dress, manner, artefacts, designs, environments

Communication: illustrations, photographs and storyboards

2 Workable designs

Materials: visual characteristics, functional characteristics, efficiency of use

Costs: work to budget, produce models, sets, props and costumes which are cost-effective

Restrictions: performing space, ergonomics, fit of costume, width of access, movement of props, working space, storage, available level of technology, minimise weight, maximise strength, durability of sets, costumes/props

Drawing conventions: formal use of visual language, mediums, creation of moods and atmospheres

Use of technology: controlling, lighting, scene changing, theatrical effects/bangs/flashes, make-up

3 Models and full-size constructions

Safety: processes, materials, designs, sets, props, effects, performers, technicians, audience, backstage, on stage, front of house

Co-ordination of performance: situation, circumstance, timing, time management, sub-contracted work

4 Organisation and management

Project management: scheduling, research, making development, refining stages, time management, sub-contracted work

Performance environment: live theatre, television studio, film/video location, performance

Job roles: set designer, costume designer/wardrobe, director, producer, lighting designer, stage managers, floor manager etc

Outcomes and assessment criteria

Outcomes	Assessment criteria for pass To achieve each outcome a learner must demonstrate the ability to:
1 Use a wide range of sources to create designs from which costumes, props and sets can be made	<ul style="list-style-type: none"> • identify distinctive characteristics suitable for visual emphasis within identified sources • carry out visual research into appearance, surface qualities, form and function to achieve effective theatrical designs • use appropriate communication techniques to develop and visualise designs for characters, sets and props
2 Produce creative and effective workable designs for costumes, properties and sets from which others can produce the designs	<ul style="list-style-type: none"> • specify appropriate materials in terms of cost, effectiveness and availability • accommodate the restrictions imposed by available facilities, materials and resources on the design and making of sets, props and costumes • use appropriate drawing conventions in communicating design intentions with others
3 Make effective and imaginative models and full-size constructions for costumes, props and sets	<ul style="list-style-type: none"> • select and use appropriate materials, processes and finishing techniques to produce models and full scale constructions • apply design principles to ensure the production of safe and effective costumes, props and sets • use technology to control the functions of sets, props and effects within the performance
4 Display a thorough knowledge of the organisation and management of the performance environment	<ul style="list-style-type: none"> • produce evidence of effective project planning and time management in relation to the performance environment • accurately estimate costs of designed models, costumes, sets, props • produce evidence showing the management structure and job roles within the performance environment

Guidance

Delivery

An active experimental approach will encourage learners to broaden their creative experiences.

As this unit is a focal point for a career pathway, much of the work for the unit is likely to be accumulated through work experience.

Work produced in this unit should encourage learners to develop a central core of employable skills which relate to existing specialisms within the entertainment industry, for example costume design making and maintenance, set design and construction, lighting design, prop making/maintenance.

Assessment

All evidence should be presented to a professional standard within a folio showing 2D and 3D work, which is arranged to emphasise to best advantage the range of skills required to design for performance. The unit is designed to be split into the sub-specialisms of set design and construction, costume design and construction, visual effects design and construction and learners are expected to follow one of these outcomes rather than all.

Links

The unit relates directly to *Unit 5: Critical Study*, *Unit 6: Professional Practice and Development*, *Unit 10: Design Principles*, *Unit 16: Specialist 3D Materials*, *Unit 17: Specialist 3D Technology and Processes*, *Unit 18: Design and Function* and *Unit 20: Marketing*.

This unit draws on *Unit 2: Historical and Contextual Referencing* and the units concerned with research. The unit is also intended to complement optional units concerned with interior design, real-time animation and environmental design.

This unit offers a point of contact with the performing arts sector.

This unit also links with the following units in the National Occupational Standards (NOS):

- Unit 31: Elements 1, 2 and 3
- Unit 32: Element 1
- Unit 3M: Elements 1, 2 and 3.

Resources

Access to studio facilities and a work area suitable for constructing three-dimensional models, props and parts of sets is essential. The workshop should be equipped with basic power and hand tools. Access to theatrical space for performance must include lighting equipment and storage and work space. Access to a video suite could be useful to some learners. A sculpture/clay area is desirable for the sculptural aspect of effects, prostheses (make-up) and prop making.

Suggested sources for research may include the library, the internet, CD-Roms, databases, specialist publications, galleries, exhibitions, questionnaires and interviews with practitioners. Learners should record sources carefully and accurately citing authors, titles of books, articles, journals and publications, date, place and country of publication.

Support materials

Books

Bay H — *Stage Design* (London Pitman, 1975)

Bradfield N — *Costume in Detail Women's Dress 1730–1930* (Eric Dobby Publishing Limited, 1995)

Davis T — *Stage Design* (RotoVision, 2001)

Pektal L — *Designing and Painting for the Theatre* (Rhinehart and Wilson, 1975)

Tompkins J — *Stage Costumes* (Pitman, 1978)

Waugh N — *The Cut of Men's Clothes 1600–1900* (Routledge, 1991)

Waugh N — *The Cut of Women's Clothes 1600–1930* (Routledge, 2000)

Unit 16: Specialist 3D Materials

Learning hours: 60

NQF Level 5: BTEC Higher National – H2

Description of unit

This unit focuses on developing and applying knowledge of 3D-related materials within the context of the learner's chosen area of specialism. The unit encourages the learner to adopt an analytical and evaluative approach to identifying the commercial implications of selecting materials.

Summary of learning outcomes

To achieve this unit a learner must:

- 1 Analyse and evaluate **production reasons** for selecting materials
- 2 Analyse and evaluate the **consumer response** to materials used in artefacts, products or environments
- 3 Demonstrate creative and functional use of selected materials in producing **effective and imaginative designs**
- 4 Analyse and **evaluate** own use of materials in artefacts, products or environments.

Content

1 **Production reasons**

Material: resistant, non-resistant

Cost: availability, processing costs

Performance: functional effectiveness, ease of use, durability, maintenance

Scale of production: individual one-off pieces, batch, large-scale production

Production requirements: associated with properties, characteristics of the material and available form, choice of production methods, skills of labour, safety

2 **Consumer response**

Build quality: solidity, weight, rigidity, suitability for the purpose

Design factors: traditional, modern, in relation to purpose, appearance and function

Product cost: cost effectiveness, maintenance costs

Operational factors: serviceability, replacement of parts, ease of cleaning, durability in use

3 **Effective and imaginative designs**

Research materials use: own exploratory work, materials used in others' similar designs, user questionnaire, market research, trade journals

Design qualities: visual, tactile, materials usage, association, eg historical developments, contemporary style; innovation

Functional aims: associated with structure and or construction, eg strength, weight, density; durability in use, serviceability, ease of use

Environmental: sustainable supplies, harmful to life in production or use, harmful by-products

4 **Evaluate**

Materials usage: design brief/specification, fitness for purpose, user/market/client response

Effectiveness of production: choice of materials and processes, finish, sensitivity in working

Outcomes and assessment criteria

Outcomes	Assessment criteria for pass To achieve each outcome a learner must demonstrate the ability to:
1 Analyse and evaluate production reasons for selecting materials	<ul style="list-style-type: none"> • determine the suitability of material in terms of cost and performance • explain the implications of material selection in terms of the production requirements and scale of production
2 Analyse and evaluate the consumers response to materials used in artefacts, products or environments	<ul style="list-style-type: none"> • describe consumers' response to materials-related design, cost and operational factors • identify how consumer choice is influenced by materials-related design, cost and operational factors • collect and record relevant evidence to support findings
3 Demonstrate creative and functional use of materials in producing effective and imaginative designs	<ul style="list-style-type: none"> • identify and use specific design qualities of materials for the best functional purpose • identify and use materials within design work to best creative advantage • relate the suitability of the selected material to environmental considerations
4 Analyse and evaluate own use of materials in artefacts, products or environments	<ul style="list-style-type: none"> • establish relevant criteria for assessing the effectiveness of materials used in design work • analyse and evaluate feedback from others in relation to the learners' own use of materials • analyse and evaluate own work in terms of effectiveness of production

Guidance

Delivery

An active experimental approach will encourage learners to broaden their understanding of the creative and utilitarian possibilities of the range of materials available to the designer. The links between materials, tools and processes require the learner to respect the workplace, the skills of specialists and the reasons for health and safety legislation. This can best be achieved through direct contact and discussion with practitioners in the work situation.

The range for this unit means that learners should get experience of materials associated with their area of specialism. The unit addresses the different perspectives of the designer, end user and producer and could best be achieved through a period of work experience.

Assessment

The work for this unit can be achieved through work experience, a 'live' project undertaken under the direction of an outside agency or integrated with the learner's chosen area by specifying tasks in project or assignment briefs. These can specify material requirements to ensure appropriate depth and breadth of skills and understanding.

Analysis of the reasons for selecting materials from the point of view of the producer (outcome 1) and the end user (outcome 2) and for the evaluation of the learner's own work (outcome 4) may be presented as written assignments in an appropriate format or presented to peer groups and/or tutors for discussion. If work experience is undertaken then evidence for outcomes 1 and 2 may be included in a work experience report presenting objective information and impressions. Design work (outcome 3) can be presented in any suitable format but should be supported by evidence of the learner's selection and use of materials.

Links

This unit develops work undertaken in *Unit 3: Properties of 3D Materials*. It also parallels *Unit 17: Specialist 3D Technology and Processes* and links with *Unit 18: Design and Function*.

This unit also links with the following units in the National Occupational Standards (NOS):

- Unit 32: Elements 1 and 3
- Unit 33: Elements 1 and 3
- Unit 3D: Element 2.

Resources

This unit requires access to workshop facilities suitably equipped for work in wood, metal and plastics, a multi-purpose sculpture area for clay, foam, plaster, latex work.

Suggested sources for research may include the library, the internet, CD-Roms, databases, specialist publications, galleries, exhibitions, questionnaires and interviews with practitioners.

Support materials

Books

Bowyer J — *Forest Products and Wood Science* (Iowa State Press, 2003)

Cleminshaw D — *Design in Plastics* (Rockport Publishers, 1989)

Forbes D — *Fibreglass and Composite Materials* (Time Warner International, 1996)

Goldsworthy A — *Stone* (Viking, 1994)

Goldsworthy A — *Wood* (Viking, 1996)

Hoadley R — *Understanding Wood: A Craftman's Guide to Wood Technology* (The Taunton Press, 2000)

Hughes R — *The Colouring, Bronzing and Patination of Metals* (Watson-Guption Publications, 1991)

Kato D — *The Art of Polymer Clay* (Watson-Guption Publications, 2003)

Lefteri C — *Plastic (Materials)* (RotoVision, 2001)

McCreight T — *Colour on Metal* (North Light Books, 2001)

McCreight T — *The Complete Metalsmith* (Davis Publications, 1991)

Unit 17: Specialist 3D Technology and Processes

Learning hours: 60

NOF Level 5: BTEC Higher National – H2

Description of unit

This unit focuses on developing and applying knowledge of 3D-related materials in the context of the learner's chosen area of specialism. The unit encourages learners to adopt an analytical and evaluative approach to identifying the implications of selecting processes and associated technologies.

Summary of learning outcomes

To achieve this unit a learner must:

- 1 Analyse and evaluate **design and production reasons** for selecting processes and technology
- 2 Analyse and evaluate the **consumer response** to processes and technology used in artefacts, products or environments
- 3 Demonstrate creative and functional use of processes and technology in producing **effective designs**
- 4 Analyse and evaluate **own use** of processes and technology in the creation of artefacts, products or environments.

Content

1 Design and production reasons

Cost: cost-effectiveness, production costs

Function: product performance, fitness for purpose, ease of use

Scale of production: individual one-off, batch, large-scale production

Design qualities: visual, tactile, processes/technology employed endowing particular qualities, association with particular historical artefacts and design styles, associations with particular uses, eg functional, symbolic, ceremonial

2 Consumer response

Product cost: in relation to competing products, maintenance costs, running costs, depreciation

Build quality: appearance and feel in relation to purpose, eg solidity, weight, rigidity, suitability for the purpose, build quality

Maintenance factors: serviceability, replacement of parts, ease of cleaning, durability in use

Marketing: product image, references to the particular materials and technologies used in marketing, evidence of consumer choice related to materials and technologies, association of advanced technology with product image, traditional product image suggesting old technology and processes

3 Effective designs

Research materials use: own exploratory work, materials used in others' similar designs, user questionnaire, market research, trade journals

Functional aims: associated with structure and or construction, eg strength, weight, density; durability in use, serviceability, ease of use

4 Own use

Process/technology usage: design brief and specification, effectiveness for achieving desired outcome, user/market/client response

Effectiveness of processes: cutting, manipulation, removal, joining, finishing, safety

Outcomes and assessment criteria

Outcomes	Assessment criteria for pass To achieve each outcome a learner must demonstrate the ability to:
1 Analyse and evaluate design and production reasons for selecting processes and technology	<ul style="list-style-type: none"> • determine the suitability of selected processes in terms of cost and function • explain the implications of selecting processes in terms of the scale of production • explain the qualities for the designer of selected processes and technologies
2 Analyse and evaluate the consumers response to processes and technology used in artefacts, products or environments	<ul style="list-style-type: none"> • describe consumers' response to processes and technology related costs, build quality and maintenance factors • identify how consumer choice is influenced by marketing that is related to technologies and materials • collect and record relevant evidence to support findings
3 Demonstrate creative and functional use of processes and technology in producing effective designs	<ul style="list-style-type: none"> • identify and use processes and associated technology to achieve functional aims and creative intentions
4 Analyse and evaluate own use of processes and technology in the creation of artefacts, products or environments	<ul style="list-style-type: none"> • establish relevant criteria for assessing the effectiveness of processes and technology used in design work • analyse and evaluate feedback from others in relation to learner's own use of processes and technology • analyse and evaluate own work in terms of effective use of processes and associated technologies

Guidance

Delivery

An active experimental approach will encourage learners to broaden their understanding of the creative and utilitarian possibilities of the range of technology and processes available to the designer. The links between technology, processes and materials also require respect for the workplace, the skills of specialists and the reasons for health and safety legislation. This can best be achieved through direct contact and discussion with practitioners in the work situation.

The unit addresses the different perspectives of the designer, end user and producer and could best be achieved through a period of work experience.

Assessment

The work for this unit can be achieved through work experience, a 'live' project undertaken under the direction of an outside agency or integrated with the learner's chosen area by specifying tasks in project or assignment briefs. These can specify process and technology requirements to ensure appropriate depth and breadth of skills and understanding.

Analysis of the reasons for selecting processes and associated technologies from the point of view of the designer, producer (outcome 1) and the end user (outcome 2) and for the evaluation of the learner's own work (outcome 4) may be presented as written assignments in an appropriate format or presented to peer groups and/or tutors for discussion. If work experience is undertaken then evidence for outcomes 1 and 2 may be included in a work experience report presenting objective information and impressions. Design work (outcome 3) can be presented in any suitable format but should be supported by evidence of the learner's selection and use of processes and technologies.

Links

This unit develops work undertaken in *Unit 4: 3D Processes and Technology*. It also links with *Unit 18: Design and Function*.

This unit also links with the following units in the National Occupational Standards (NOS):

- Unit 32: Elements 1 and 2
- Unit 33: Elements 1, 2 and 3
- Unit 34: Elements 1, 2 and 3.

Resources

This unit requires access to workshop facilities suitably equipped for 3D work with reference to a range of processes and associated technologies.

Suggested sources for research may include: the library, the internet, CD-Roms, databases, specialist publications, galleries, exhibitions, questionnaires and interviews with practitioners.

Support materials

Books

Bowyer J — *Forest Products and Wood Science* (Iowa State Press, 2003)

Cleminshaw D — *Design in Plastics* (Rockport Publishers, 1989)

Forbes D — *Fibreglass and Composite Materials* (Time Warner International, 1996)

Goldsworthy A — *Stone* (Viking, 1994)

Goldsworthy A — *Wood* (Viking, 1996)

Hoadley R — *Understanding Wood: A Craftman's Guide to Wood Technology* (The Taunton Press, 2000)

Hughes R — *The Colouring, Bronzing and Patination of Metals* (Watson-Guptil Publications, 1991)

Kato D — *The Art of Polymer Clay* (Watson-Guptill Publications, 2003)

Lefteri C — *Plastic (Materials)* (RotoVision, 2001)

McCreight T — *Colour on Metal* (North Light Books, 2001)

McCreight T — *The Complete Metalsmith* (Davis Publications, 1991)

Unit 18: Design and Function

Learning hours: 60

NOF Level 5: BTEC Higher National – H1

Description of unit

This unit focuses on design and function in crafts, 3D design and spatial design. It encourages learners to develop a personal response to the often conflicting demands of appearance and function. The unit addresses the practical and technical issues encountered when designing and making 3D artefacts.

Summary of learning outcomes

To achieve this unit a learner must:

- 1 Determine the **functional features** of artefacts, products or spatial environments
- 2 Analyse and evaluate the **aesthetic significance** of the design of artefacts, products or spatial environments
- 3 Produce design work that establishes a balance between **functional and aesthetic criteria**
- 4 **Evaluate** and analyse the effects of the artefact, product or spatial environment.

Content

1 **Functional features**

Functional considerations: ergonomics, physical, operational requirements

Capabilities of materials: strength, resilience, deformability, plasticity, hardness

Production processes: hand-made, machine, assembly

2 **Aesthetic significance**

Aesthetic values: taste, time, association, styles, fashions, artefacts, buildings, environments

Purpose: functional, symbolic, commemorative, fashionable

Aesthetic or symbolic needs: commemorative, beliefs

3 **Functional and aesthetic criteria**

Client values: traditional, contemporary

Aesthetic and functional conflicts: visual considerations, practical considerations, tactile considerations, aural considerations, psychological considerations, association

Functional requirements: effectiveness, cost, practicality, durability, reliability, convenience, ease of use, handling, opening, closing, storing, space occupation/utilisation, safety

4 **Evaluate**

Evaluation: measure performance against intentions, subjective assessment, considered response or feedback, sales performance, response of clients

Criteria for assessment: physical size, composition, theme, formal elements, comfort, effectiveness, pleasurable, aural or tactile criteria

Outcomes and assessment criteria

Outcomes	Assessment criteria for pass To achieve each outcome a learner must demonstrate the ability to:
1 Determine the functional features of artefacts, products or spatial environments	<ul style="list-style-type: none"> • identify the impact on the design of the capabilities of the materials of which it is made • identify the impact on the design of the materials used
2 Analyse and evaluate the aesthetic significance of the design of artefacts, products or spatial environments	<ul style="list-style-type: none"> • analyse and identify the aesthetic significance of the design • identify the practicalities that need to be addressed by the design
3 Produce design work that establishes a balance between functional and aesthetic criteria	<ul style="list-style-type: none"> • identify client or user values to be addressed by the design process • produce design work which explores and resolves conflicts between aesthetic and functional requirements • produce models and prototypes which satisfy the identified functional requirements
4 Evaluate and analyse the effects of the artefact, product or spatial environment	<ul style="list-style-type: none"> • establish objective criteria for assessing functional and visual effectiveness • apply objective criteria to own work

Guidance

Delivery

An active experimental approach will encourage learners to broaden their understanding of the creative and utilitarian possibilities offered by the range of materials available to the designer. The links between materials, processes and technologies require respect for the workplace, the skills of specialists and the reasons for health and safety legislation. This can best be achieved through direct contact and discussion with practitioners in the work situation.

Learners are encouraged to research and critically analyse the way in which others have resolved the tension between function and aesthetics.

It is expected that evidence for this unit will be in a variety of formats including 3D work accompanied by annotated visual work, photographs and written work.

Assessment

The work for this unit can be achieved through work experience, a 'live' project completed with an outside agency or integrated with the learner's chosen area of specialist work.

Analysis of the learner's own and others' work may be presented as written assignments in an appropriate format or presented to peer groups and/or tutors for discussion. Learners should be able to articulate their own thinking using appropriate language, through discussion and evaluation, developing and clarifying their own understanding of the relationship between function and appearance.

Evidence of practical application of the principles of design and function can be presented in any format appropriate to the nature of the work.

Links

The work of this unit is central to the learners determining their own views and design personality. It develops and expands the critical skills resulting from *Unit 2: Historical and Contextual Referencing* and *Unit 5: Critical Study*. It also helps focus the learner's work in *Unit 3: Properties of 3D Materials* and *Unit 4: 3D Technology and Processes* and in the specialist units *Unit 10: Design Principles*, *Unit 16: Specialist 3D Materials* and *Unit 17: Specialist 3D Technology and Processes*.

This unit also links with the following units in the National Occupational Standards (NOS):

- Unit 31: Elements 1, 2 and 3
- Unit 33: Elements 1, 2 and 3
- Unit 3D: Elements 1 and 2.

Resources

This unit requires the learner to research the work of others and demonstrate their own understanding by producing 2D and 3D work which illustrates their views. For this, access to suitably equipped drawing and workshop facilities is necessary, as are research facilities. Learners should record sources carefully and accurately citing authors, titles of books, articles, journals and publications, date, place and country of publication.

Support materials

Books

Bayer P — *Art Deco Interiors* (Thames & Hudson, 1998)

Cranz G — *The Chair: Rethinking Culture, Body and Design* (WW Norton and Company, 2000)

Fiell C — *1000 Chairs* (Taschen, 2000)

Fiell C — *Modern Furniture Classics* (Thames & Hudson, 2001)

Frampton K — *Modern Architecture: A Critical History* (Thames & Hudson, 1992)

Nuttgens P — *The Story of Architecture* (Phaidon Press Limited, 1997)

Pile J — *A History of Interior Design* (Laurence King Publishing Limited, 2000)

Sembach K — *Furniture Design* (Taschen, 2002)

Unit 19: Visual and Personal Presentation

Learning hours: 60

NOF Level 5: BTEC Higher National – H1

Description of unit

This unit will enable learners to develop skills in communicating design intentions in 2D and 3D. The unit encourages learners to apply and refine visual presentation skills and develop their own distinctive approach to the presentation of design work.

Summary of learning outcomes

To achieve this unit a learner must:

- 1 Research and evaluate a range of **presentation types**
- 2 Use an appropriate **strategy** to present design work effectively
- 3 Use **materials, media and techniques** to present design work effectively
- 4 Evaluate the **effect of the presentation** and identify areas for improvement.

Content

1 **Presentation types**

Type of presentation: direct, eg personal, computer based, audio-visual; indirect, eg mailshot, CD-Rom, internet, intranet

2 **Strategy**

Audience: size, colleagues, client, employer, prospective employer, knowledgeable or uninformed audience

Presentation environment: inside, outside, space available, own/client's/employer's premises, office, site, cyberspace

Available facilities: blackout, power source, projection equipment, effective lighting, light box, internet/intranet, computer, plinths, display material

3 **Materials, media and techniques**

2D techniques: drawing, painting, printing, photocopying, collage, photography, computer generated

3D techniques: models and techniques, appropriate to learner's selected specialism

Intentions: visual impact, clarity, presentation, quality

Personal presentation: clarity of speech, speed of speech, vocabulary used, body language

4 **Effect of the presentation**

Audience feedback: questionnaire, direct discussion

Changes: visual impact, manner, commentary, content

Outcomes and assessment criteria

Outcomes	Assessment criteria for pass To achieve each outcome a learner must demonstrate the ability to:
1 Research and evaluate a range of presentation types	<ul style="list-style-type: none"> • research into a range of contemporary presentation types • select a type of presentation based on research and work to be presented
2 Use an appropriate strategy to present design work effectively	<ul style="list-style-type: none"> • use 2D media and visualising techniques to effectively explain design intentions • use materials and model-making techniques to effectively communicate design intentions
3 Use materials, media and techniques to present design work effectively	<ul style="list-style-type: none"> • identify requirements of audience • identify constraints of presentation environment and available facilities • select the required presentation approach for a particular situation • match use of visual aids to presentation type • demonstrate effective personal presentation technique
4 Evaluate the effect of the presentation and identify areas for improvement	<ul style="list-style-type: none"> • collect and analyse feedback information and identify aspects for improvement • in relation to feedback identify changes to presentation format and/or techniques

Guidance

Delivery

An analytical approach will encourage learners to examine the effects of their visual and personal presentations and those of others. This will involve interviews with presentation observers and communication specialists.

Assessment

Learners are encouraged to research and critically analyse the effectiveness of visual and personal presentation methods used by themselves, tutors, design practitioners and professional communicators. Evidence of this may be in written critiques and also in the composition and quality of their portfolio of work. Learners can practise personal and visual presentation and provide evidence of improvement through successive assessments in which the learner formally presents work.

Analysis of the presentation techniques used by the learner and others, can be presented as written critiques. Learners should be able to articulate their own thinking using appropriate language, through discussion and evaluation, demonstrating a broader understanding of personal and visual presentation and its effects on career development.

Links

The work of this unit is central to the development of employable skills and relates to *Unit 3: Properties of 3D Materials*, *Unit 4: 3D Technology and Processes*, *Unit 6: Professional Practice and Development*, *Unit 7: Professional Studies* and *Unit 18: Design and Function*.

This unit also links with the following units in the National Occupational Standards (NOS):

- Unit 33: Elements 1, 2 and 3
- Unit 34: Element 3.

Resources

This unit requires access to studio and workshop facilities suitable for 2D and 3D work in the learner's selected area of design specialism.

Suggested sources for research may include the library, the internet, CD-Roms, databases, specialist publications, galleries, exhibitions, questionnaires and interviews with practitioners. Learners should record sources carefully and accurately citing authors, titles of books, articles, journals and publications, date, place and country of publication.

Support materials

Books

Gombrich E H — *Art and Illusion: A Study of the Psychology of Pictorial Representation* (Phaidon Press Limited, 1995)

Hoffman D — *Visual Intelligence — What We Create and What We See* (WW Norton & Company, 1998)

Tufle E — *Envisioning Information* (Graphics Press, 1993)

Unit 20: Marketing

Learning hours: 60

NQF Level 5: BTEC Higher National – H1

Description of unit

This unit emphasises the importance of marketing both to commercial organisations and individual designers. The unit covers the basic principles of marketing products and services in a competitive, commercial environment. It also explores how individual designers can use marketing to promote their own skills and abilities.

Summary of learning outcomes

To achieve this unit a learner must:

- 1 Research and analyse the **purpose and intentions** of marketing
- 2 Research and analyse the relationship between **marketing and design**
- 3 Apply **marketing principles** to promotion of own work imaginatively and effectively
- 4 Evaluate the application of marketing principles to **promotion of own work**.

Content

1 Purpose and intentions

Market factors: age, interest, need, ethnicity, gender, politics, social, religious

Market needs: need, sector, price quality, delivery, means

Market research: limited trials, conferences, exhibitions, interest groups, trade journals, direct consumer response, indirect consumer response, marketing consultants

Market access: direct selling, mail order, retail, internet

Publicity: advertising, magazines, newspapers, television, radio

Promotion: loss leaders, exhibitions, specific interest events

2 Marketing and design

Market driven design factors: fashion, eg appearance, form, distinctive features, colour, surface, graphics, packaging; function, eg definition of need, size, weight, complexity, build quality, reliability; competition, cost

3 Marketing principles

Improving effect on the market: product quality, value, public relations, after sales service, sales techniques, response time, distribution, product/company image, graphics, housestyle, packaging, publicity, merchandising

4 Promotion of own work

Traditional approaches: composition, clarity, visual presentation standards

Contemporary approaches: digital, CD-Rom, video, internet

Personal approaches: attitude, manner, speech clarity, confidence, dress

Outcomes and assessment criteria

Outcomes	Assessment criteria for pass To achieve each outcome a learner must demonstrate the ability to:
1 Research and analyse the purpose and intentions of marketing	<ul style="list-style-type: none"> • describe the value of marketing to the commercial organisation and to the individual • devise and implement a strategy for gathering marketing information • analyse and evaluate the marketing information gathered • identify techniques adopted by commercial organisations to improve their effect on the market
2 Research and analyse the relationship between marketing and design	<ul style="list-style-type: none"> • use market research to understand user response and identify design need • identify design features which generate positive market responses • modify design strategy in response to marketing information
3 Apply marketing principles to promotion of own work imaginatively and effectively	<ul style="list-style-type: none"> • explore the effectiveness of alternative approaches to promoting work • analyse views of others in relation to content and presentation of own work • respond to the views of others in producing effective visual presentation of own work
4 Evaluate the application of marketing principles to promotion of own work	<ul style="list-style-type: none"> • evaluate how effectively marketing worked in terms of own work • evaluate the effect of marketing on target audience

Guidance

Delivery

An analytical approach will encourage learners to respond in written and visual terms to their own design work and also to the work of others. This will involve design research, interviews with clients, their employees, product users and design practitioners.

The work for this unit can be integrated within the learner's chosen area of specialism by specifying tasks in project briefs which specify marketing requirements and which are accompanied by related assessment criteria.

Research is developed through this unit so that learners fully understand the importance of marketing to the direction and quality of their work and ultimately to their employability.

Assessment

Learners are encouraged to research and critically analyse the effectiveness of marketing by individuals, design practitioners and commercial design organisations. The evidence of this may be in written, audio or visual formats but must indicate an increasing level of objectivity in understanding the importance of marketing.

Analysis of learners' own and others' work may be presented in written or annotated visual format or may be presented to peer groups and/or tutors for discussion. Learners should be able to articulate their own thinking using appropriate language, through discussion and evaluation, demonstrating a broader understanding of marketing, its effects on creative work and on the production of functional and reliable products.

Links

The work of this unit is central to the learner's understanding of the commercial aspects of the design process and relates most directly to *Unit 5: Critical Study*, *Unit 6: Professional Practice and Development* and *Unit 7: Professional Studies*.

This unit also links with the following units in the National Occupational Standards (NOS):

- Unit 31: Elements 1
- Unit 33: Elements 1, 2 and 3
- Unit 3D: Elements 1, 2 and 3.

Resources

Suggested sources for research may include the library, the internet, CD-Roms, databases, specialist publications, exhibitions, questionnaires and interviews with practitioners.

The work for this unit should be integrated within the main body of 3D work which needs access to suitably equipped studio and workshop facilities.

Support materials

Books

Brierley S — *The Advertising Handbook* (Routledge, 1995)

Cummins J — *Sales Promotion* (Kogan Page, 1989)

Davis M — *The Effective Use of Advertising Media* (Random House Business Books, 1992)

Dzamic L — *No Copy Advertising* (RotoVision, 2000)

Reis A — *The 22 Immutable Laws of Branding* (HarperCollins, 1999)

Solomon M — *Consumer Behaviour* (FT Prentice Hall, 1996)

Unit 21: Ceramics

Learning hours: 60

NOF Level 5: BTEC Higher National – H2

Description of unit

In this unit learners will acquire an understanding of the functional and aesthetic properties of ceramics materials and artefacts, of the making, decorating and firing processes used. They will develop high-level competence in controlling the creative process from inception to realisation.

Learners will be expected to understand the role and responsibilities of the designer/maker in a commercial context, including one-off and batch production, and to develop the ability to communicate 3D ideas through 2D drawing techniques and 3D making and modelling skills.

Summary of learning outcomes

To achieve this unit a learner must:

- 1 Demonstrate a thorough knowledge of the **visual and tactile characteristics** of ceramics
- 2 Demonstrate skills in **design development**, using appropriate drawing systems to communicate ideas and respond to identified needs
- 3 Develop an understanding of the **making processes** to meet requirements
- 4 Demonstrate an understanding of **professional practice**, including contractual and health and safety issues.

Content

1 Visual and tactile characteristics

Natural properties of clay: different clays, preparation of clay for use, malleability, shaping and forming processes, treatment processes

Aesthetic characteristics: appearance, formal qualities, surface decoration and treatment, volume, scale, cultural significance

Functional characteristics: strengths, weaknesses and limitations of materials and their treatment, principle of form related to function, construction methods, surface treatment, durability

Creative potential: choice of materials, making processes which determine appearance, traditional and non-traditional processes, relationship to other materials

2 Design development

Research: identification of required information, selection and interpretation, reference to relevant contexts, eg historical, contemporary, cultural; market research

2D and 3D ideas generation: using research, initial responses, developmental and experimental work, working drawings, models

Making: maquettes, models, experimental constructions, prototypes, testing materials and completing the production process

Presentation: communication of ideas, different techniques, drawings, photographs, audio-visual presentations, folio, display and exhibition, publications

3 Making processes

Hand and machine-making processes: modelling, hand-building, throwing, mould-making, slip casting, turning, decorating and finishing

Glazes and firing methods: glaze recipes, glaze application, basic kiln use and maintenance, firing control methods, use of different fuels and kiln types, low and high temperature cycles, raku, salt glaze

Surface decoration: modelled, carved, incised, relief, sprigging, combing etc, slips, underglaze, on-glaze, glazes

4 Professional practice

Business skills: time management, budget control, control of making/manufacturing process, client/customer relations, contracts, communication

Presentation, marketing and promotion: alternative methods, market information and analysis, clients' needs, consumer needs

Legislation: public liability, contractual obligations, copyright, health and safety

Ethical and environmental considerations: ecological, economic, elimination of waste, durability, relationship to environment (visual and ecological), public welfare, consumer interests

Outcomes and assessment criteria

Outcomes	Assessment criteria for pass To achieve each outcome a learner must demonstrate the ability to:
1 Demonstrate a thorough knowledge of the visual and tactile characteristics of ceramics	<ul style="list-style-type: none"> • select materials appropriate to intended purposes, taking into account the natural properties of clay and associated products • understand and use the aesthetic and functional characteristics of ceramics to make full use of their creative potential
2 Demonstrate skills in design development , using appropriate drawing systems to communicate ideas and respond to identified needs	<ul style="list-style-type: none"> • analyse and clarify the brief by carrying out research to obtain information relevant to design development • produce working drawings, maquettes and prototypes when necessary • develop a range of alternative solutions in two and three dimensions • prepare effective presentations of proposed design solutions
3 Develop an understanding of the making processes to meet requirements	<ul style="list-style-type: none"> • use the properties and characteristics of ceramics to create effective solutions to design briefs • use appropriate hand and machine making methods to meet design requirements • use effective decorating, glazing and firing methods to achieve the desired finish
4 Demonstrate an understanding of professional practice , including contractual and health and safety issues	<ul style="list-style-type: none"> • operate effectively within a professional context, utilising business skills, project management and budget control • develop and maintain effective communications with clients and work colleagues • present, promote and market products • operate effectively with due regard to relevant legislation, ethical and environmental considerations

Guidance

Delivery

It is important that learners gain a thorough understanding of contemporary professional practice and do as much work experience as possible. The aim is for learners to attain appropriate professional skills and attitudes to work within a commercial context. Where work experience is difficult to arrange, simulated experiences should be as realistic as possible. Arranging visits to professional studios, workshops and appropriate industrial sites is an important addition to work experience.

Learners should use a wide range of appropriate research methods in preparing and developing a project, including practical exploration of materials, techniques and technology and consultation and marketing techniques. They should develop competence in studio practice and observe health and safety legislation in relation to their own and others' welfare.

Assessment

Learners should be encouraged to make extensive records of all work undertaken, including practical work, research, work experience and outside visits. The records can be in written form, with illustrations, or in media such as tape recordings, video, digital imaging and so on. Evidence of the progress of projects should include the full range of processes carried out from inception to realisation.

In all forms of communication and debate, learners should use appropriate vocabulary and correct terminology.

Links

This unit provides opportunities to link with other disciplines, especially other design crafts such as glass and light metals. Sculpture is another possible link within the fine art pathway.

This unit relates directly to *Unit 3: Properties of 3D Materials*, *Unit 4: 3D Technology and Processes*, *Unit 5: Critical Study*, *Unit 8: Design Method*, *Unit 10: Design Principles* and *Unit 17: Specialist 3D Technology and Processes*.

This unit also links with the following units in the National Occupational Standards (NOS):

- Unit 31: Elements 1, 2 and 3
- Unit 33: Elements 1, 2 and 3
- Unit W: Elements 1, 2 and 3.

Resources

It is essential that adequate resources are available for handling ceramics materials. These should include: specialist workshop(s); storage for work in progress and raw materials; machinery and equipment for clay, slip and glaze preparation; equipment for shaping, forming and constructing ceramic objects; a separate area for plasterwork; a kiln room; computer-assisted-design programmes (3D modelling programmes if possible); and reference collections.

Support materials

Books

Connell J — *The Potter's Guide to Ceramic Surfaces* (Apple Press, 2002)

French N — *Potter's Directory of Shape and Form (Ceramics)* (A&C Black Limited, 1998)

Mattison S — *The Complete Potter* (Apple Press, 2003)

Rice P — *British Studio Ceramics* (The Crowood Press, 2002)

Unit 22: Jewellery, Accessories and Body Adornment

Learning hours: 60

NOF Level 5: BTEC Higher National – H2

Description of unit

In this unit learners will gain knowledge and understanding of the decorative and aesthetic properties of jewellery, accessories and body adornment. They will develop an understanding of construction methods, explore the properties of a wide range of materials and select appropriate manufacturing processes and finishing techniques. They will develop high-level competence in controlling the creative process from inception to realisation. Learners will be expected to develop an understanding of the role and responsibilities of the designer/maker in a commercial context, including one-off and batch production, and to develop the ability to communicate 3D ideas.

Summary of learning outcomes

To achieve this unit a learner must:

- 1 Demonstrate a thorough knowledge of the **visual, tactile and decorative characteristics** of jewellery, accessories and body adornment
- 2 Demonstrate skills in **design development**, using appropriate techniques to communicate 3D ideas and respond to identified needs
- 3 Develop an understanding of **structures, materials and making processes** to meet design requirements
- 4 Demonstrate an understanding of **professional practice**, including contractual and health and safety issues.

Content

1 Visual, tactile and decorative characteristics

Aesthetic and decorative characteristics: as objects in relation to the body, appearance, use of visual elements, materials, details, finishes and treatments, cultural significance

Creative potential: choice of materials and processes which determine appearance, traditional and non-traditional, natural properties of materials

2 Design development

Research: selection and interpretation, reference to relevant contexts, eg historical, contemporary, cultural; market research, ergonomic requirements, ethical and environmental issues

2D and 3D ideas generation: using research, initial responses, developmental and experimental work, working drawings, models

Making: maquettes, experimental constructions, prototypes, testing materials and structures, and completing the production process

Presentation: communication of ideas, different techniques — drawings, photographs, audio-visual presentations, folio, display and exhibition, publications

3 Structures, materials and making processes

Properties and characteristics: structural (strengths, weaknesses and limitations), malleability, durability, protective, decorative, tactile finishes

Effective solutions: form related to function, ergonomics, construction methods

Making and finishing processes: hand and machine, traditional and non-traditional techniques, handling precious and non-precious materials, eg minerals, organic and man made materials

4 Professional practice

Business skills: time management, budget control, control of making/manufacturing process, client/customer relations, contracts, communication within a team and with clients

Presentation, marketing and promotion: alternative methods, market information and analysis, clients' needs, consumer needs

Legislation: public liability, indemnity insurance, British/EU standards, contractual obligations, copyright, health and safety

Ethical and environmental considerations: ecological, economic, elimination of waste, durability, relationship to environment (visual and ecological), public welfare, consumer interests

Outcomes and assessment criteria

Outcomes	Assessment criteria for pass To achieve each outcome a learner must demonstrate the ability to:
1 Demonstrate a thorough knowledge of the visual, tactile and decorative characteristics of jewellery, accessories and body adornment	<ul style="list-style-type: none"> • research, record and select materials appropriate to intended purposes • understand and use aesthetic and decorative characteristics • make full use of the creative potential of chosen materials
2 Demonstrate skills in design development , using appropriate techniques to communicate 3D ideas and respond to identified needs	<ul style="list-style-type: none"> • select and use the properties and characteristics of materials and techniques to create effective solutions to design briefs • use appropriate making and finishing processes to meet design requirements
3 Develop an understanding of structures, materials and making processes to meet design requirements	<ul style="list-style-type: none"> • carry out research to obtain information relevant to design development • produce working drawings, visuals, scale models and prototypes • explore possible design solutions and communicate ideas through drawing, sampling, model making • prepare effective presentations of proposed design solutions
4 Demonstrate an understanding of professional practice , including contractual and health and safety issues	<ul style="list-style-type: none"> • operate effectively within a professional context • present, promote and market products • work safely and with due regard to relevant legislation, observing contractual obligations, ethical and environmental considerations

Guidance

Delivery

It is important that learners gain a thorough understanding of contemporary professional practice and do as much work experience as possible. The aim is for learners to attain appropriate professional skills and attitudes to work within a commercial context. Where work experience is difficult to arrange, simulated experiences should be as realistic as possible. Arranging visits to professional studios, workshops and appropriate industrial sites is an important addition to work experience.

Learners should use a wide range of appropriate research methods in preparing and developing a project, including practical exploration of materials, techniques and technology, consultation and marketing techniques. They should develop competence in studio practice and observe health and safety legislation in relation to their own and others' welfare.

Assessment

Learners should be encouraged to make extensive records of all work undertaken, including practical work, research, work experience and outside visits. The records can be in written form, with illustrations, or in media such as tape recordings, video, digital imaging and so on. Evidence of the progress of projects should include the full range of processes carried out from inception to realisation.

In all forms of communication and debate, learners should use appropriate vocabulary and correct terminology.

Links

This unit provides opportunities to link with other disciplines, especially fashion and textiles and other design crafts such as light metals, glass, ceramics and wood; also exhibitions and retail design.

This unit relates directly to *Unit 3: Properties of 3D Materials*, *Unit 4: 3D Technology and Processes*, *Unit 5: Critical Study*, *Unit 8: Design Method*, *Unit 10: Design Principles*, *Unit 16: Specialist 3D Materials* and *Unit 17: Specialist 3D Technology and Processes*.

This unit also links with the following units in the National Occupational Standards (NOS):

- Unit 31: Elements 1, 2 and 3
- Unit 33: Elements 1, 2 and 3
- Unit W: Elements 1, 2 and 3.

Resources

It is essential that adequate resources are available for handling a variety of materials. These should include: specialist jewellery workshop(s); secure storage for precious materials and hazardous chemicals; a separate area for general workshop activities to accommodate mixed media activities; computer-assisted design programmes; and reference collections. Workshops and equipment must follow appropriate health and safety guidelines.

Support materials

Books

Galli M — *The Art of Jewellery Design: Principles of Design, Rings and Earrings* (Schiffer Publishing Limited, 1994)

Habsburg G — *The World of Faberge* (Booth-Clibborn Editions, 2000)

Mazloun C — *Jewellery Design in the 21st Century* (Gremese, 1999)

Phillips C — *Jewellery: From Antiquity to the Present* (Thames & Hudson, 1996)

Unit 23: Light Metals

Learning hours: 60

NOF Level 5: BTEC Higher National – H2

Description of unit

In this unit learners will gain knowledge and understanding of the functional and aesthetic properties of light metals, and develop an understanding of the properties of ferrous, non-ferrous metals and alloys with regard to the construction, fabrication, surface treatments and finishing techniques. They will develop an understanding of making, decorating and finishing processes, and develop a high level of competence in controlling the creative process from inception to realisation.

Learners will be expected to develop an understanding of the role and responsibilities of the designer-maker in a commercial context, including one-off and batch production and to develop the ability to communicate three-dimensional ideas.

Summary of learning outcomes

To achieve this unit a learner must:

- 1 Demonstrate a thorough knowledge of the **visual, tactile, and functional characteristics** of light metals
- 2 Demonstrate skills in **design development** using appropriate techniques to communicate 3D ideas and to respond to identified needs
- 3 Develop an understanding of **structures, materials and making processes** to meet design requirements
- 4 Demonstrate a knowledge of **professional practice**, including contractual and health and safety issues.

Content

1 Visual, tactile and functional characteristics

Aesthetic characteristics: appearance, decoration and treatments, colour, deformation, volume, shape, form, structure, surfaces and finishes

Functional characteristics: strengths, weaknesses and limitations of light metals, principle of form related to function, construction and structural possibilities, malleability, ductility, surface treatment, durability

Creative potential: choice of materials, how their use determines outcomes, choice of type of metal and making processes, including surface, chemical and temperature treatment, deformation and finishing, traditional and non-traditional use of materials and processes, relationship to other materials and processes

2 Design development

Research: identification of required information, selection and interpretation, reference to relevant contexts (historical, contemporary, cultural), market research

Ideas generation: using research, initial responses, developmental and experimental work, working drawings, samples, models

Making: experimental constructions and samples, prototypes, testing materials, structures and finishes, and completing the production process

3 Structures, materials and making processes

Properties and characteristics of light metals: structural strengths, flexibility, durability, finishes

Hand and machine-making processes: forming, pressing, raising, spinning, lathe work, folding, bending, cold and hot joining, cutting techniques, grinding, polishing, decorating and finishing etc

Surface decoration: etched, engraved, painted, enamelled, polished, chased, repoussé, patination

4 Professional practice

Business skills: time management, budget control, control of making/manufacturing process, client/customer relations, contracts, communication within a team and with clients

Presentation, marketing and promotion: alternative methods, market information and analysis, clients' needs, consumer needs, communication of ideas, different techniques, folio, display and exhibition, publications

Legislation: public liability, indemnity insurance, British/EU standards, contractual obligations, copyright, health and safety

Ethical and environmental considerations: ecological, economic, elimination of waste, durability, relationship to environment (visual and ecological), public welfare, consumer interests

Outcomes and assessment criteria

Outcomes	Assessment criteria for pass To achieve each outcome a learner must demonstrate the ability to:
1 Demonstrate a thorough knowledge of the visual, tactile and functional characteristics of light metals	<ul style="list-style-type: none"> • research, record and select materials appropriate for intended purposes • understand and use the aesthetic and functional characteristics of light metals in the creative process • make full use of the creative potential of chosen materials
2 Demonstrate skills in design development , using appropriate techniques to communicate 3D ideas and respond to identified needs	<ul style="list-style-type: none"> • carry out research to obtain information relevant to design development • explore possible design solutions through drawing, sampling and model making • produce working drawings, visuals, scale models and prototypes • prepare effective presentations of proposed design solutions
3 Develop an understanding of structures, materials and making processes to meet design requirements	<ul style="list-style-type: none"> • use the properties and characteristics of light metals to create effective solutions to design briefs • use appropriate hand and machine making processes to meet design requirements including the introduction of other materials when required
4 Demonstrate a knowledge of professional practice , including contractual and health and safety issues	<ul style="list-style-type: none"> • operate effectively within a professional context • present, promote and market products • work safely and with due regard to relevant legislation, ethical and environmental considerations

Guidance

Delivery

Learners should gain a thorough understanding of contemporary professional practice, and do as much work experience as possible. The aim is for learners to attain appropriate professional skills and attitudes to work within a commercial context. Where work experience is difficult to arrange, simulated experiences should be as realistic as possible. Arranging visits to professional studios, workshops and appropriate industrial sites is an important addition to work experience.

Learners should use a wide range of appropriate research methods in preparing and developing a project, including practical exploration of materials, techniques and technology, consultation and marketing techniques. They should develop competence in studio practice and observe health and safety legislation in relation to their own and others' welfare.

Assessment

Learners should be encouraged to make extensive records of all work undertaken, including practical work, research, work experience and outside visits. The records can be in written form, with illustrations, or in media such as tape recordings, video, digital imaging and so on. Evidence of the progress of projects should include the full range of processes carried out from inception to realisation. A distinguishing feature of design crafts is that the complete process is normally controlled by the designer maker.

In all forms of communication and debate, learners should use appropriate vocabulary and correct terminology.

Links

This unit provides opportunities to link with other disciplines, especially other design crafts such as furniture, jewellery and body adornment.

This unit relates directly to *Unit 3: Properties of 3D Materials*, *Unit 4: 3D Technology and Processes*, *Unit 5: Critical Study*, *Unit 8: Design Method*, *Unit 10: Design Principles*, *Unit 16: Specialist 3D Materials* and *Unit 17: Specialist 3D Technology and Processes*.

This unit also links with the following units in the National Occupational Standards (NOS):

- Unit 31: Elements 1, 2 and 3
- Unit 33: Elements 1, 2 and 3
- Unit W: Elements 1, 2 and 3.

Resources

It is essential that adequate resources are available for handling light metals. These should include: specialist workshop(s); storage for work in progress and raw materials; machinery and equipment for handling and finishing small metals; equipment for cutting, shaping, joining, forming and constructing (including a gas and air supply); a separate area for applying treatment and finishing, eg kiln for enamelling and facilities for acid and chemical treatments; computer-assisted design programmes; reference collections; sourced components; and production facilities. Workshops and equipment must follow appropriate health and safety guidelines.

Support materials

Books

Hughes R — *The Colouring, Bronzing and Patination of Metals* (Watson-Guption Publications, 1991)

McCreight T — *The Complete Metalsmith* (Davis Publications, 1991)

McCreight T — *Colour on Metal* (North Light Books, 2001)

Unit 24: Wood

Learning hours: 60

NQF Level 5: BTEC Higher National – H2

Description of unit

In this unit learners will acquire knowledge and understanding of the functional and aesthetic properties of wood and wood-based materials. They will develop their understanding of forming, shaping, construction and finishing methods used in making wood and wood-based artefacts in a professional context. Learners will be expected to develop high-level competence in controlling the creative process from inception to design realisation. They will also develop an understanding of the roles and responsibilities of the professional designer/maker within a range of practices, ranging from one-off and small-scale production to mass manufacture. It is important that they develop the ability to communicate 3D ideas.

Summary of learning outcomes

To achieve this unit a learner must:

- 1 Demonstrate a thorough knowledge of the **visual and tactile characteristics** of wood and wood-based materials
- 2 Demonstrate skills in **design development**, using appropriate drawing systems to communicate ideas, and respond to identified needs
- 3 Develop an understanding of **structures and making processes** to meet design requirements
- 4 Demonstrate an understanding of **professional practice**, including contractual and health and safety legislation.

Content

1 Visual and tactile characteristics

Aesthetic characteristics: visual and tactile qualities, colour, grain, surface, volume, structure, finish

Functional characteristics: strengths and limitations, durability, structural possibilities, ergonomic considerations

Creative potential of chosen materials: how their use determines outcomes, effects of making/shaping/forming processes on appearance, traditional and non-traditional uses of materials

2 Design development

Design briefs: analysis of need, client requirements, consumer interests, possible alternative solutions, consultation, teamwork

Research: selection and interpretation of relevant information, statistical and market information, sources of ideas, reference to relevant contexts, eg historical, contemporary, cultural

2D and 3D ideas generation: development, working drawings, experiments with materials, construction methods and finishes, making maquettes, models, experimental constructions, prototypes and testing materials

Presentation and communication of ideas: drawing, models, displays, audio-visual presentations, multi media, seminars

3 Structures and making processes

Properties and characteristics: structural strengths, tensile strengths, compression, flexibility, durability of hard and soft woods and composite materials, maintenance, protective finishes

Hand and machine-making processes: cutting, piercing, shaping, forming, constructing and finishing

Production: one-off, small-batch and large-scale manufacture

Other materials: steel, glass, ceramic, plastics etc

4 Professional practice

Business skills: time management, budget control, control of making/manufacturing process, client/customer relations, contracts, communication within team and with clients

Presentation, marketing and promotion: alternative methods, market information and analysis, client's needs, consumer needs

Legislation: public liability, contractual issues, copyright, health and safety

Ethical and environmental considerations: ecological, economic, elimination of waste, durability, relationship to environment (visual and ecological), public welfare, consumer interests

Outcomes and assessment criteria

Outcomes	Assessment criteria for pass To achieve each outcome a learner must demonstrate the ability to:
1 Demonstrate a thorough knowledge of the visual and tactile characteristics of wood and wood-based materials	<ul style="list-style-type: none"> • research, record and select materials appropriate to intended purposes • understand and use the aesthetic and functional characteristics of wood in the creative process • make full use of the creative potential of chosen materials
2 Demonstrate skills in design development , using appropriate drawing systems to communicate ideas and respond to identified needs	<ul style="list-style-type: none"> • analyse client needs, identify consumer interests and engage in consultation • research appropriate contexts to obtain information relevant to design development • develop in 2D and 3D a range of alternative solutions to design problems • produce working drawings, maquettes and prototypes • prepare effective presentations of proposed design solutions
3 Develop an understanding of structures and making processes to meet design requirements	<ul style="list-style-type: none"> • use the properties and characteristics of wood to create effective solutions to design briefs • use appropriate hand and machine making methods to meet design requirements, including the introduction of other materials when required
4 Demonstrate an understanding of professional practice , including contractual and health and safety legislation	<ul style="list-style-type: none"> • operate effectively within a professional context • present, promote and market products • work safely and with due regard to relevant legislation, ethical and environmental considerations

Guidance

Delivery

It is important that learners gain a thorough understanding of contemporary professional practice, and do as much work experience as possible. The aim is to enable learners to attain appropriate professional skills and attitudes to work within a commercial context. Where work experience is difficult to arrange, simulated experiences should be as realistic as possible. Arranging visits to professional studios, workshops and appropriate industrial sites is an important addition to work experience.

Learners should use a wide range of appropriate research methods in preparing and developing a project, including practical exploration of materials, techniques and technology, consultation and marketing techniques. They should develop competence in studio practice and observe health and safety legislation in relation to their own and others' welfare.

Assessment

Learners should be encouraged to make extensive records of all work undertaken, including practical work, research, work experience and outside visits. The records can be in written form, with illustrations, or in media such as tape recordings, video, digital imaging and so on. Evidence of the progress of projects should include the full range of processes carried out from inception to realisation.

In all forms of communication and debate, learners should use appropriate vocabulary and correct terminology.

Links

This unit provides opportunities to link with other disciplines, especially other design crafts units, furniture design and product design.

The unit relates directly to *Unit 3: Properties of 3D Materials*, *Unit 4: 3D Technology and Processes*, *Unit 5: Critical Study*, *Unit 8: Design Method*, *Unit 10: Design Principles*, *Unit 16: Specialist 3D Materials* and *Unit 17: Specialist 3D Technology and Processes*.

This unit also links with the following units in the National Occupational Standards (NOS):

- Unit 31: Elements 1, 2 and 3
- Unit 33: Elements 1, 2 and 3
- Unit W: Elements 1, 2 and 3.

Resources

It is essential that adequate resources are available for handling wood and wood-based products. These should include: specialist workshop(s); storage for work in progress; machinery for preparation and working with materials; drawing studio facilities, computer-assisted-design programmes (3D modelling programmes if possible); and reference collections (eg photography, computer technology, production facilities, reprographic processes, business studies, reference books, magazines, CD-Roms etc).

Support materials

Books

Bowyer J — *Forest Products and Wood Science* (Iowa State Press, 2003)

Goldsworthy A — *Wood* (Viking, 1996)

Hoadley R — *Understanding Wood: A Craftsmen's Guide to Wood Technology* (The Taunton Press, 2000)

Unit 25: Glass

Learning hours: 60

NOF Level 5: BTEC Higher National – H2

Description of unit

In this unit learners will gain knowledge and understanding of the functional and aesthetic properties of glass materials and artefacts. They will gain an understanding of the technical qualities and properties of glass by selecting appropriate manufacturing processes and finishing techniques. They will develop high-level competence in controlling the creative process from inception to realisation.

Learners will be expected to develop an understanding of the role and responsibilities of the designer/maker in a commercial context, including one-off and batch production and to develop the ability to communicate 3D ideas.

Summary of learning outcomes

To achieve this unit a learner must:

- 1 Demonstrate a thorough knowledge of the **visual, tactile, and functional** characteristics of glass
- 2 Demonstrate skills in **design development**, using appropriate techniques to communicate 3D ideas and respond to identified needs
- 3 Develop an understanding of the **making processes** to meet design requirements
- 4 Demonstrate a knowledge of **professional practice**, including contractual and health and safety issues.

Content

1 Visual, tactile and functional characteristics

Aesthetic characteristics: appearance, clarity, colour, density, shape, form, surface, finish

Functional characteristics: strengths, weaknesses, limitations of the treatment of glass, principle of form related to function, construction methods, surface treatment, durability

Creative potential: choice of making process which determine appearance, traditional and non-traditional processes, relationship to other materials and processes

2 Design development

Research: identification of required information, selection and interpretation, reference to relevant contexts, eg historical, contemporary, cultural; market research

Ideas generation: using research, initial responses, developmental and experimental work, working drawings, samples, models etc

Making: experimental constructions, samples, prototypes, testing materials, structures and finishes, completing the production process

Presentation: communication of ideas, drawings, photographs, audio-visual presentations, folio, display, exhibition, publications

3 Making processes

Properties and characteristics of glass: inherent, eg floated, sheet solid or blown form; structural strengths, durability, maintenance, quality, raw ingredients, furnace and firing processes

Hand and machine-making processes: shaping, blowing, pouring, floating, cutting, joining, piercing, grinding, polishing, colouring, sand-blasting, etching, shattering, decorating and finishing for example

Surface decoration: etched, engraved, painted, polished, etc

4 Professional practice

Business skills: time management, budget control, control of making/manufacturing process, client/customer relations, contracts, communication within team and with clients

Presentation, marketing and promotion: alternative methods, market information and analysis, clients' needs, consumer needs

Legislation: public liability, indemnity insurance, British/EU standards, contractual obligations, copyright, health and safety

Ethical and environmental considerations: ecological, economic, elimination of waste, durability, relationship to environment (visual and ecological), public welfare, consumer interests

Outcomes and assessment criteria

Outcomes	Assessment criteria for pass To achieve each outcome a learner must demonstrate the ability to:
1 Demonstrate a thorough knowledge of the visual, tactile, and functional characteristics of glass	<ul style="list-style-type: none"> • research, record and select materials appropriate to intended purposes • understand and use the aesthetic and functional characteristics of glass in the creative process • make full use of the creative potential of glass
2 Demonstrate skills in design development , using appropriate techniques to communicate 3D ideas and respond to identified needs	<ul style="list-style-type: none"> • carry out research to obtain information relevant to design development • explore possible design solutions through drawing, sampling and model making • produce working drawings, visuals, scale models and prototypes • prepare effective presentations of proposed design solutions
3 Develop an understanding of making processes to meet design requirements	<ul style="list-style-type: none"> • use the properties and characteristics of glass to create effective solutions to design briefs • use appropriate hand and machine making processes to meet design requirements
4 Demonstrate a knowledge of professional practice , including contractual and health and safety issues	<ul style="list-style-type: none"> • operate effectively within a professional context • present, promote and market products • work safely and with due regard to relevant legislation, ethical and environmental considerations

Guidance

Delivery

It is important that learners gain a thorough understanding of contemporary professional practice, and work at this level should include as much work experience as possible. The aim is to enable learners to attain appropriate professional skills and attitudes to work within a commercial context. Where work experience is difficult to arrange, simulated experiences should be as realistic as possible. Arranging visits to professional studios, workshops and appropriate industrial sites is an important addition to work experience.

Learners should use a wide range of appropriate research methods in preparing and developing a project, including practical exploration of materials, techniques and technology, consultation and marketing techniques. They should develop competence in studio practice and observe health and safety legislation in relation to their own and others' welfare.

Assessment

Learners should be encouraged to make extensive records of all work undertaken, including practical work, research, work experience and outside visits. The records can be in written form, with illustrations, or in media such as tape recordings, video, digital imaging and so on. Evidence of the progress of projects should include the full range of processes carried out from inception to realisation. A distinguishing feature of design crafts is that the complete process is normally controlled by the designer/maker.

In all forms of communication and debate, learners should use appropriate vocabulary and correct terminology.

Links

This unit provides opportunities to link with other disciplines, especially other design crafts such as ceramics and light metals. Sculpture is another possible link within the fine art pathway.

This unit relates directly to *Unit 3: Properties of 3D Materials*, *Unit 4: 3D Technology and Processes*, *Unit 5: Critical Study*, *Unit 8: Design Method*, *Unit 10: Design Principles*, *Unit 16: Specialist 3D Materials* and *Unit 17: Specialist 3D Technology and Processes*.

This unit also links with the following units in the National Occupational Standards (NOS):

- Unit 31: Elements 1, 2 and 3
- Unit 33: Elements 1, 2 and 3
- Unit W: Elements 1, 2 and 3.

Resources

It is essential that adequate resources are available for handling glass in its various forms. These should include: specialist workshop(s) which comply with appropriate health and safety guidelines; storage of raw materials; machinery and equipment for preparation and finishing in its hot and cold states; equipment for shaping, moulding, forming, blowing, slumping and laminating glass objects; a separate area for mould and model making with clay, plasterwork and woodworking facilities; a kiln room; computer-assisted design programmes (3D modelling programmes if possible); and reference collections.

Support materials

Books

Arwas V — *The Art of Glass: Art Nouveau to Art Deco* (Andreas Papadakis Limited, 1999)

Jackson L — *20th Century Factory Glass* (Rizzoli International Publications, 2000)

Lefteri C — *Glass (Materials for Inspirational Design)* (RotoVision, 2004)

Tosa G — *Murano Glass: A History of Glass* (Arsenale Editrice, 2001)

Unit 26: Exhibition and Retail Design

Learning hours: 60

NQF Level 5: BTEC Higher National – H2

Description of unit

In this unit learners will gain knowledge and understanding of communication through exhibition and display. They will develop the ability to organise and manipulate spatial awareness. They will develop high-level competence in controlling the creative process from inception to design realisation.

Learners will be expected to develop an understanding of the role and responsibilities of the designer in a commercial context, and to develop the ability to communicate 3D ideas through 2D drawing techniques and 3D making, modelling and prototyping skills.

Summary of learning outcomes

To achieve this unit a learner must:

- 1 Demonstrate a thorough knowledge of the **visual, tactile and functional characteristics** of exhibition and retail design
- 2 Demonstrate skills in **design development**, using appropriate techniques to communicate ideas and respond to identified needs
- 3 Develop an understanding of **structures, spatial awareness, materials and processes** to meet design requirements
- 4 Demonstrate a knowledge of **professional practice**, including contractual and health and safety issues.

Content

1 Visual, tactile and functional characteristics

Aesthetic characteristics: appearance, visual elements, materials, techniques and processes, details, finishes and treatments, cultural significance

Functional characteristics: strengths, weaknesses, limitations, application of materials, form related to function, ergonomics, construction, durability, finishes

Creative potential: choice of materials and construction processes which determine appearance, traditional and non-traditional materials and processes

2 Design development

Research: required information, selection, interpretation, reference to relevant contexts, eg historical, contemporary, cultural; market research, ergonomic requirements, ethical and environmental issues

2D and 3D ideas generation: using research, initial responses, developmental and experimental work, working drawings, models, construction methods and finishes

Making: maquettes, models, experimental constructions and installations, prototypes, testing materials, structures, sensory influences, completing the production process

Presentation: communication of ideas, drawings, photographs, audio-visual presentations, folio, display and exhibition, publications for example

3 Structures, spatial awareness, materials and processes

Properties and characteristics: structural strengths, durability, finishes, tactile, audible, atmospheric and spatial conditions

Construction finishing methods: hand and machine-making processes relevant to the chosen materials, preparation, cutting, joining, forming, assembly

Installations: temporary/moveable, permanent

Materials: investigations, using wood, metal, plastics, fabrics, reclaimed/recycled materials, organic synthetic materials

4 Professional practice

Business skills: time management, budget control, control of making/manufacturing process, client/customer relations, contracts, communication within team and with clients

Presentation, marketing and promotion: alternative methods, market information and analysis, clients' needs, consumer needs

Legislation: public liability, indemnity insurance, British/EU standards, contractual obligations, copyright, health and safety

Ethical and environmental considerations: ecological, economic, elimination of waste, durability, relationship to environment (visual and ecological), public welfare, consumer interests

Outcomes and assessment criteria

Outcomes	Assessment criteria for pass To achieve each outcome a learner must demonstrate the ability to:
1 Demonstrate a thorough knowledge of the visual, tactile and functional characteristics of exhibition and retail design	<ul style="list-style-type: none"> • research and record specific ideas and select materials appropriate to intended purpose • understand and use aesthetic and functional characteristics which influence outcomes • make full use of the creative potential of chosen materials and other elements
2 Demonstrate skills in design development , using appropriate techniques to communicate ideas and respond to identified needs	<ul style="list-style-type: none"> • carry out research to obtain information relevant to design development • explore possible design solutions through ideas generation and model making • produce working drawings, visuals, scale models and prototypes • prepare effective presentations of proposed design solutions
3 Develop an understanding of structures, spatial awareness, materials and processes to meet design requirements	<ul style="list-style-type: none"> • use the properties and characteristics of materials, techniques and conditions to create effective solutions to design briefs • use appropriate construction and finishing methods to meet design requirements
4 Demonstrate a knowledge of professional practice , including contractual and health and safety issues	<ul style="list-style-type: none"> • operate effectively within a professional context • present, promote and market designs • work safely and with due regard to relevant legislation, ethical and environmental considerations

Guidance

Delivery

It is important that learners gain a thorough understanding of contemporary professional practice, and work at this level should include as much work experience as possible. The aim is to enable learners to attain appropriate professional skills and attitudes to work within a commercial context. Where work experience is difficult to arrange, simulated experiences should be as realistic as possible. Arranging visits to professional studios, workshops and appropriate industrial sites and locations is an important addition to work experience.

Assessment

In planning their own work, learners should be encouraged to work systematically and efficiently. Learners need to engage in and record integrated research, to include analysis of the brief, preparation of initial ideas, market research, investigation and practical demonstration into materials, processes and techniques. Learners will need to explore the visual and tactile properties and characteristics of materials and investigate contexts and design development needs to demonstrate the selection and interpretation of research information. This will necessitate practical first-hand experience in manipulating materials to meet requirements of briefs.

It is important that a level of practical competence is shown in studio and workshop practice, combined with evidence of an awareness of relevant safe working practice and health and safety, in relation to consumers, public liability and copyright laws. Learners should keep records of professional practice (meetings/attendance/punctuality/contracts etc).

It is important that learners provide evidence of the correct use of terminology and vocabulary in written and oral presentation.

Links

This unit provides opportunities to link with other disciplines, especially environmental design, furniture and interior design.

This unit relates directly to *Unit 3: Properties of 3D Materials*, *Unit 4: 3D Technology and Processes*, *Unit 5: Critical Study*, *Unit 8: Design Method*, *Unit 10: Design Principles*, *Unit 16: Specialist 3D Materials* and *Unit 17: Specialist 3D Technology and Processes*.

This unit also links with the following units in the National Occupational Standards (NOS):

- Unit 31: Elements 1, 2 and 3
- Unit 33: Elements 1, 2 and 3
- Unit W: Elements 1, 2 and 3.

Resources

It is essential that adequate resources are available for handling a variety of materials. These should include specialist workshop(s) (sound, lighting and 3D) for wood and metal work, and with appropriate machinery and equipment for converting materials, fabrication and assembly of models, samples and prototypes. Where possible access to equipment for handling other materials such as plastics, plaster and clay would be of benefit. Workshops and equipment must follow appropriate health and safety guidelines.

Support materials

Books

Din R — *New Retail* (Conran Octopus, 2000)

Riewoldt O — *Brandscaping: Worlds of Experience in Retail Design* (Birkhauser Verlag, 2002)

Tucker J — *Retail Desire: Design, Display and the Art of the Visual Merchandiser* (RotoVision, 2003)

Unit 27: Interior Design

Learning hours: 60

NQF Level 5: BTEC Higher National – H2

Description of unit

In this unit learners will acquire the skills and understanding needed to create and modify interior environments for specific purposes. They will develop spatial awareness and competence in working with 3D formal elements. Learners will also develop an understanding of the roles and responsibilities of the professional interior designer, including working within teams of other professionals. Learners will develop the ability to communicate 3D ideas through a range of visual presentation techniques.

Summary of learning outcomes

To achieve this unit a learner must:

- 1 Demonstrate the ability to create and modify **interior environments** to meet design requirements
- 2 Demonstrate an understanding of the **technical processes** involved in responding to an interior design brief
- 3 Show an ability to analyse, clarify and respond to the **aesthetic and functional requirements** of design briefs and architects' specifications
- 4 Work within a team of professional practitioners to develop an understanding of **professional practice**.

Content

1 Interior environments

Design processes: concept generation, concept analysis, development, experimentation, selection, modification, completion

Research: identification of information sources, selection and interpretation of information, market research, consumer interests and needs, client needs, appropriate cultural, contemporary and historical contexts

Environmental, ethical and ecological considerations: visual effects, public uses, elimination of waste, waste disposal, services, efficiency, implementation costs, maintenance requirements, health and safety, public liability

2 Technical processes

Accurate measurement: related to spaces, specification details

Drawings and models: orthographic, perspective, CAD, 3D digital imaging, scale models, furnishing samples

Preparation of specifications: materials, fixtures, fittings, furnishing, working methods and associated sub-contracted processes, construction, furnishing and decorating techniques, maintenance schedule

3 Aesthetic and functional requirements

Analysis of brief: clarification of requirements, initial research and response, possible solutions, proposed alternative solutions

Formal elements: volume, scale, proportion, colour, surface decoration, the spatial relationships between objects and those between objects and the space they occupy

Create designs: social, civic, recreational, entertainment, business and professional use; modification of interior environments, eg refurbishment

Further research: consultation with clients, potential users, wider public, other professionals, eg structural engineer

Presentation: proposed design solutions, use of drawings, CAD, models, audio-visual, video and mixed media

4 Professional practice

The designer's role as commercial practitioner: business skills, time management, budget control, record keeping, planning, communication within team and with clients, general public

Legislation: contracts, sub-contracts, copyright, public liability, health and safety

Costing: estimating, work in progress, completion dates and schedules, penalties, sub-contracting

Outcomes and assessment criteria

Outcomes	Assessment criteria for pass To achieve each outcome a learner must demonstrate the ability to:
1 Demonstrate the ability to create and modify interior environments to meet design requirements	<ul style="list-style-type: none"> • complete the design process from inception, through research and development of ideas to realisation • assess relevant ethical, environmental and health and safety considerations in responding to the brief
2 Demonstrate an understanding of the technical processes involved in responding to an interior design brief	<ul style="list-style-type: none"> • prepare appropriate, accurate orthographic drawings to scale • prepare specifications for materials, fixtures, fittings, furnishing and any contracted services employed
3 Show an ability to analyse, clarify and respond to the aesthetic and functional requirements of design briefs and architects' specifications	<ul style="list-style-type: none"> • analyse the brief, conduct appropriate research and propose solutions to the aesthetic and functional requirements • use appropriate 3D formal elements to develop design solutions • create designs for interior environments to meet specified purposes, where appropriate undertaking further research • use appropriate 2D and 3D presentation techniques
4 Work within a team of professional practitioners to develop an understanding of professional practice	<ul style="list-style-type: none"> • keep thorough records of work experience, team consultations, visits to observe professional practice • understand and use relevant legislation • communicate effectively with a range of interest groups and colleagues • work to cost estimates, specifications, schedules and completion dates

Guidance

Delivery

It is important that learners gain a thorough understanding of contemporary professional practice, and work at this level should include as much work experience as possible. The aim is to enable learners to be able to attain appropriate professional skills and attitudes to work within a commercial context. Where work experience is difficult to arrange, simulated experiences should be as realistic as possible. Arranging visits to professional studios, and appropriate architectural sites is an important addition to work experience.

Assessment

Learners should be encouraged to develop a range of research methods appropriate to interior design practice and an understanding of design development processes, particularly those involving teamwork. They should keep good records of all experience of professional practice whether in the form of work experience or visits. Presentation methods should include drawing to communicate ideas, orthographic drawing, CAD where appropriate, model making, photography and video if available. It is important that learners gain a thorough understanding of architectural practice, relevant legislation, including health and safety, public liability and copyright law. Studio work should be organised to reflect patterns and standards of professional practice. Outside work should include site visits, experience of measuring, surveying and estimating.

Learners should gain a sound knowledge of construction techniques, decoration, furnishing, fixtures and fittings and preparing specifications for sub-contractors. They should develop competence in working with materials samples and the use of colour for particular purposes. They should have some experience of contract and project management and, where appropriate, constraints such as local authority bye laws and planning regulations should be included in design briefs.

Links

Because of the breadth of study involved in becoming a competent interior designer, potential links with other disciplines are extensive, ranging from architectural practice to interior decoration, textiles, furniture design, exhibition design and design crafts.

This unit also links with the following units in the National Occupational Standards (NOS):

- Unit 31: Elements 1, 2 and 3
- Unit 33: Elements 1, 2 and 3
- Unit W: Elements 1, 2 and 3.

Resources

These must include adequate studio facilities with access to technical drawing equipment, CAD, photography and model making. There will need to be adequate reference materials available to support research studies and from which learners are able to develop technical specifications.

Support materials

Books

Bayer P — *Art Deco Interiors: Decoration and Design Classics of the 1920s and 1930s* (Thames & Hudson, 1998)

Calloway S — *The Elements of Style: Encyclopaedia of Domestic Architectural Details* (Mitchell Beazley, 1996)

Ching F — *Interior Design Illustrated* (John Wiley & Sons Inc, 1987)

Pile J — *A History of Interior Design* (Laurence King Publishing Limited, 2000)

Annex A

QCA codes

The QCA National Qualifications Framework (NQF) code is known as a Qualification Accreditation Number (QAN). Each unit within a qualification will also have a QCA NQF unit code.

The QCA qualification and unit codes will appear on the learner's final certification documentation.

The QANs for qualifications in this publication are:

100/4150/3	Edexcel Level 5 BTEC Higher National Certificate in 3D Design
100/4151/5	Edexcel Level 5 BTEC Higher National Diploma in 3D Design.

Annex B

Mapping against NVQ in Design – Level 3

The following grid maps the knowledge covered in the NVQ in Design Level 3 against the underpinning knowledge of the BTEC Higher National Diploma/Certificate in 3D Design.

HND/C titles NVQ unit titles	Unit 1: Drawing Techniques and Approaches	Unit 2: Historical and Contextual Referencing	Unit 3: Properties of 3D Materials and Media	Unit 4: 3D Technology and Processes	Unit 5: Critical Study	Unit 6: Professional Practice and Development	Unit 7: Professional Studies	Unit 8: Design Method	Unit 9: Computer Applications in Art and Design	Unit 10: Design Principles	Unit 11: 3D Animated Products	Unit 12: Product Design	Unit 13: Commercial Model Making	Unit 14: Furniture Design	Unit 15: Design for Performance	Unit 16: Specialist 3D Materials	Unit 17: Specialist 3D Technology and Processes	Unit 18: Design and Function	Unit 19: Visual and Personal Presentation	Unit 20: Marketing
31: Clarify briefs and research information		3					3			3	3	3	3	3	3			3		3
32: Develop design ideas using materials, processes and technology	3		3	3					3	3	3	3	3	3	3	3	3			
33: Develop and present suitable design responses	3						3									3	3	3	3	3
34: Produce and present detailed design proposals	3						3										3		3	
3D: Research design trends and developments in materials and technology		3	3	3	3				3		3					3		3		3
3M: Plan and manage design work						3						3	3	3	3					

<div style="text-align: center;">HND/C titles</div> <div style="text-align: left;">NVQ unit titles</div>	Unit 1: Drawing Techniques and Approaches	Unit 2: Historical and Contextual Referencing	Unit 3: Properties of 3D Materials and Media	Unit 4: 3D Technology and Processes	Unit 5: Critical Study	Unit 6: Professional Practice and Development	Unit 7: Professional Studies	Unit 8: Design Method	Unit 9: Computer Applications in Art and Design	Unit 10: Design Principles	Unit 11: 3D Animated Products	Unit 12: Product Design	Unit 13: Commercial Model Making	Unit 14: Furniture Design	Unit 15: Design for Performance	Unit 16: Specialist 3D Materials	Unit 17: Specialist 3D Technology and Processes	Unit 18: Design and Function	Unit 19: Visual and Personal Presentation	Unit 20: Marketing
W: Create and maintain safe and effective working relationships								3	3					3						
3P: Realise design prototypes										3										
3R: Plan and contribute to the realisation of final design or design product(s)							3													
F: Undertake freelance work																				
S: Sell and promote designs and design services																				

HND/C titles NVQ unit titles	Unit 21: Ceramics	Unit 22: Jewellery, Accessories and Body Adornment	Unit 23: Light Metals	Unit 24: Wood	Unit 25: Glass	Unit 26: Exhibition and Retail Design	Unit 27: Interior Design
31: Clarify briefs and research information	3	3	3	3	3	3	3
32: Develop design ideas using materials, processes and technology							
33: Develop and present suitable design responses	3	3	3	3	3	3	3
34: Produce and present detailed design proposals							
3D: Research design trends and developments in materials and technology							
3M: Plan and manage design work							
W: Create and maintain safe and effective working relationships	3	3	3	3	3	3	3
3P: Realise design prototypes							

<div style="text-align: center;">HND/C titles</div> <div style="text-align: left;">NVQ unit titles</div>	Unit 21: Ceramics	Unit 22: Jewellery, Accessories and Body Adornment	Unit 23: Light Metals	Unit 24: Wood	Unit 25: Glass	Unit 26: Exhibition and Retail Design	Unit 27: Interior Design
3R: Plan and contribute to the realisation of final design or design product(s)							
F: Undertake freelance work							
S: Sell and promote designs and design services							

Annex C

Wider curriculum mapping

All units have health and safety dimensions. The programme has a strong practical emphasis so the issues related to health and safety may occur naturally in external and internal assessment. Learners must be made aware of this issue during development of the qualifications. Some specialist units have specialist health and safety features.

Units will need to take into account safe workshop practice and COSHH standards.

Wider social and cultural issues may be explored throughout the qualifications. Specialist units may provide opportunities to explore these factors as single units or in combination. Listed below are some potential areas for exploration.

Cultural and social issues — core units

Unit 2: Historical and Contextual Referencing	Issues may be raised in this unit dependent on theme. European art and non-European art may be appropriate source material to be explored. World art forms may also provide material.
Unit 26: Exhibition and Retail Design	This unit would provide the opportunity to explore issues of employment and equal rights. The rights and responsibilities of the workers in the cultural industries will feature as part of the content of this unit. Issues related to Europe-wide employment contexts may provide a theme for the learner.
Unit 20: Marketing	This unit may offer the potential for an overview of the cultural, ethical and moral context of the development of 3D design. This may best be delivered through a case study approach.
Unit 8: Design Method	A practical unit which presents the opportunity for the exploration of cultural and social themes related to the chosen theme.
Unit 5: Critical Study	This unit offers the opportunity for the learner following a design-based approach, to explore the wider visual arts context in research and development of production ideas.

Annex D

Qualification Requirement

BTEC Higher Nationals in 3D Design

This Qualification Requirement should be read in conjunction with overarching guidance from Edexcel.

Rationale

BTEC Higher Nationals in 3D Design have been developed to focus on:

- providing education and training for a range of careers in 3D design
- providing opportunities for facilities managers to achieve a nationally recognised level four vocationally specific qualification
- providing opportunities for full-time learners to gain a nationally recognised vocationally specific qualification to enter employment in 3D design or progress to higher education vocational qualifications such as a full-time degree in 3D design or related area
- developing the knowledge, understanding and skills of learner in the field of 3D design
- providing opportunities for learners to focus on the development of higher level skills in a 3D design context
- providing opportunities for learners to develop a range of skills and techniques and attributes essential for successful performance in working life
- develop learners' ability to manage themselves
- develop learners' critical awareness and their ability to research and synthesise complex information
- develop learners' skills in communication and presentation
- develop learners' ability to handle information.

Aims of the qualification

This qualification meets the needs of the above rationale by:

- equipping individuals with knowledge, understanding and skills for success in employment in the 3D design area
- enabling progression to an undergraduate degree or further professional qualification in 3D design or related area
- providing opportunities for specialist study relevant to individual vocations and contexts
- to support individuals employed or entering employment in the 3D design area
- developing the individual's ability in the 3D design area through effective use and combination of the knowledge and skills gained in different parts of the programme

- developing a range of skills and techniques, personal qualities and attributes essential for successful performance in working life and thereby enable learners to make an immediate contribution to 3D design
- providing flexibility, knowledge, skills and motivation as a basis for future studies and career development in the 3D design area.

Mandatory curriculum

Drawing techniques in 3D design: learners should experiment with drawing techniques and approaches in order to broaden their understanding of visual language.

Computers in art and design: learners should explore the creative potential of computers in the context of 3D art, craft and design.

Context: learners should study cultural history that informs current thought and debate within 3D Design. The emphasis should be on research and study skills and on learners acquiring source material and knowledge.

Professional studies: learners should relate practical studies in 3D design to a professional context.

Ideas: learners should be introduced to a number of ideas-generating techniques to demonstrate that creative thinking is a skill that can be developed rather than just left to chance.

Critical study: learners should be provided with the knowledge, skill and understanding necessary to define and research and historical context and relate it to the present.

Professional body recognition

The BTEC Higher Nationals in 3D Design have been developed with career progression and recognition by professional bodies in mind. It is essential that learners gain the maximum benefit from their programme of study.

Links to National Standards

There is the opportunity for programmes in 3D design to provide some of the underpinning knowledge, understanding and skills for the Level 3 NVQ Design.

Entry prerequisites

There are no particular entry requirements for this qualification. Please refer to Edexcel guidance on entry requirements (to be developed). Learners who enter with at least one of the following are likely to benefit more readily from an art and design programme: a BTEC National, Advanced GNVQ or AVCE in an art and design related subject, a relevant GCE profile with appropriate supporting passes at GCSE, appropriate work experience.

Higher-level skills and abilities

Learners will be expected to develop the following skills during the programme of study:

- analysing, synthesising and summarising information critically
- the ability to read and use appropriate literature and contextual information with a full and critical understanding
- the ability to think independently and solve problems
- the ability to take responsibility for their own learning and recognise their own learning style
- obtaining and integrating several lines of subject-specified evidence to formulate and develop ideas
- applying subject knowledge and understanding to address familiar and unfamiliar problems
- recognising the moral and ethical issues of design-based enquiry and experimentation and appreciating the need for ethical standards and professional codes of conduct
- designing, planning, conducting and reporting on assignments
- undertaking studio practice in a responsible, safe and ethical manner
- develop an appreciation of the interdisciplinary nature of 3D design, and the capacity to give a clear and accurate account of a subject, marshal arguments in a mature way and engage in debate and dialogue both with specialists and non-specialists.

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