

Level 3 Fundamentals of Building Information Modelling (6073-30)

Version 01 (September 2016)

Qualification Handbook Technicals

Qualification at a glance

Industry area	Construction
City & Guilds number	6073
Age group	16+
Assessment	Short Answer
Grading	Pass/Merit/Distinction
Approvals	Qualification approval
Support materials	Assessment pack Qualification handbook
Registration and certification	Registration and certification of this qualification is through the Walled Garden, and is subject to end dates.

Title and level	GLH	TQT	City & Guilds qualification number	Ofqual accreditation number
Level 3 Fundamentals of Building Information Modelling (BIM)	10	12	6073-30	603/0568/X

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1 Introduction

This document tells you what you need to do to deliver the qualification:

Area	Description
Who is the qualification for?	Our one unit course in the fundamentals of BIM is aimed at raising awareness for individuals working within construction companies needing to respond to the BIM agenda.
What is involved in delivering this course?	These qualifications will often be delivered alongside other construction related qualifications eg apprenticeships, Level 3 Technical Levels. The fundamentals of BIM could be delivered over one or two days or as a series of short sessions through lectures and research using the Internet.
What does the qualification cover?	Learners will gain knowledge of fundamental concepts associated with BIM and develop an understanding of the drivers leading to BIM implementation, the barriers to success and the benefits that can be gained.
What opportunities for progression are there?	Learners will be able to use our qualifications to extend their current role within an organisation with BIM decision making capability, or enter the industry as a new entrant with sought after knowledge on how to plan and facilitate the implementation of BIM within an organisation.
Who did we develop the qualification with?	Our qualifications were developed with the support of consultants working directly with the BIM Task Group, supporting and helping to deliver the objectives of the Government Construction Strategy and the requirement to strengthen the public sector's capability in BIM implementation.

Structure

Total Qualification Time

Total Qualification Time (TQT) is the total amount of time, in hours, expected to be spent by a Learner to achieve a qualification. It includes both guided learning hours (which are listed separately) and hours spent in preparation, study and assessment.

Title and level	GLH	TQT
Level 3 Fundamentals of Building Information Modelling (BIM)	10	12

2 Centre requirements

Approval

New centres will need to gain centre approval. Existing centres who wish to offer this qualification must go through City & Guilds' full Qualification Approval Process. There is no fast track approval for this qualification. Please refer to the City & Guilds website for further information on the approval process: www.cityandguilds.com

To offer these qualifications, new centres will need to gain both centre and qualification approval. Please refer to the Centre Manual - Supporting Customer Excellence for further information.

Centre staff should familiarise themselves with the structure, content and assessment requirements of the qualifications before designing a course programme.

Resource requirements

Centre staffing

Staff delivering these qualifications must be able to demonstrate that they meet the following occupational expertise requirements. They should:

- be occupationally competent or technically knowledgeable in the area[s] for which they are delivering training and/or have experience of providing training. This knowledge must be to the same level as the training being delivered
- have recent relevant experience in the specific area they will be assessing
- have credible experience of providing training.

See the assessment strategy for details on the role of supervisors and managers in the assessment process.

Centre staff may undertake more than one role, eg tutor and assessor or internal verifier, but cannot internally verify their own assessments.

It is highly recommended that staff have experience within the construction industry and a working knowledge of BIM and it's implementation.

Learner entry requirements

City & Guilds does not set entry requirements for these qualifications. However, centres must ensure that candidates have the potential and opportunity to gain the qualifications successfully.

Age restrictions

City & Guilds cannot accept any registrations for learners under 16 as these qualifications are not approved for learners under 16.

3 Delivering the qualification

Initial assessment and induction

An initial assessment of each candidate should be made before the start of their programme to identify:

- if the candidate has any specific training needs
- support and guidance they may need when working towards their qualifications
- any units they have already completed, or credit they have accumulated which is relevant to the qualifications
- the appropriate type and level of qualification.

We recommend that centres provide an induction programme so the candidate fully understands the requirements of the qualification[s], their responsibilities as a candidate, and the responsibilities of the centre. This information can be recorded on a learning contract.

Support materials

The following resources are available for these qualifications:

Description	How to access
Assessment pack	Available on the qualification pages on the City & Guilds Website: www.cityandguilds.com

Recording documents

Candidates and centres may decide to use a paper-based or electronic method of recording evidence.

City & Guilds endorses several ePortfolio systems, including our own, Learning Assistant, an easy-to-use and secure online tool to support and evidence learners' progress towards achieving qualifications. Further details are available at: www.cityandguilds.com/eportfolios.

City & Guilds has developed a set of *Recording forms* including examples of completed forms, for new and existing centres to use as appropriate. Recording forms are available on the City & Guilds website.

Although new centres are expected to use these forms, centres may devise or customise alternative forms, which must be approved for use by the external verifier, before they are used by candidates and assessors at the centre. Amendable (MS Word) versions of the forms are available on the City & Guilds website.

4 Assessment

Summary of assessment methods

Candidates must:

- successfully complete one short answer test for the one mandatory unit

Available assessments/assignments

City & Guilds has written the following assessments to use with this qualification:

- 3 versions of short answer papers plus an additional sample assessment

Assessment Types

Unit	Title	Assessment method	Where to obtain assessment materials
301	Fundamentals of BIM	Short Answer Paper	Materials can be found on the 6073 suite page on the City and Guilds website. These are password protected, passwords can be obtained from Walled Garden.

Time constraints

Candidates should be given 60 minutes to complete this 40 mark assessment.

Examination specification(s)

The table below shows how marks for the exam are allocated in relation to the qualification content:

Test Specifications

301 Fundamentals of BIM - 40 Marks							
LO		Topic		Knowledge		Understanding	
1	Know the fundamentals of BIM	1	Key terms	2	5%	0	0%
		2	BIM principles	0	0%	8	20%

301 Fundamentals of BIM - 40 Marks							
		3	Maturity levels	4	10%	0	0%
		4	Standards			0	0%
		5	Technology	0	0%	4	10%
2	Understand the purpose of BIM	1	Drivers	3	8%	3	8%
		2	Enablers	0	0%	4	10%
		3	Benefits	2	5%	4	10%
		4	Barriers	2	5%	4	10%
Total				13	33%	27	68%

5 Moderation and standardisation of assessment

Internal standardisation of marking

The centre is required to standardise the assessment across different teaching groups, to ensure that all work at the centre has been judged against the same standards. If two or more tutors are involved in marking assessments, one supervisor/tutor must be designated as responsible for internal standardisation.

Common pieces of work must be marked on a trial basis and differences between assessments discussed at an internal training session in which all tutors involved must participate.

The supervisor/tutor responsible for standardising the marking must ensure that the training includes the use of reference and archive materials such as work from a previous year.

Supervision and authentication of internally assessed work

The Head of Centre is responsible to City & Guilds for ensuring that internally assessed work is conducted in accordance with City & Guilds instructions and JCQ instructions.

City & Guilds requires:

- learners to sign the record form to confirm that the work submitted is their own
- tutors to confirm on the record form that the work assessed is solely that of the learner concerned and was conducted under the conditions laid down in the handbook and assessment pack
- the supervisor/tutor responsible for internal standardisation also to sign the Centre Declaration Sheet (CDS) to confirm that internal standardisation has taken place and that the work presented is that of the learners named. If only one teacher has undertaken the marking, that person must sign this form.

The completed record form must be attached to each learner's work and the Centre Declaration Sheet must be sent to the moderator. Failure to sign either or both the record form and the CDS may delay the processing of the learners' results.

The supervisor/tutor should be sufficiently aware of the learner's standard and level of work to appreciate if the work submitted is beyond the ability of the learner.

In all cases, some direct supervision is necessary to ensure that the work submitted can be confidently authenticated as the learner's own.

If it is believed that a learner has received additional assistance and this is acceptable within the guidelines for the internally assessed assessment, the supervisor/tutor should award a mark which represents the learner's unaided achievement. The authentication statement should be signed and information given on the relevant form.

If the supervisor/tutor is unable to sign the authentication statement for a particular learner, then the learner's work cannot be accepted for assessment.

Retaining evidence

The centre must retain the work of all learners for each assessment, with record forms attached, under secure conditions, from the time it is assessed, to allow for the possibility of an enquiry about results. The work may be returned to learners after the deadline for enquiries about results. If an

enquiry about a result has been made, the work must remain under secure conditions in case it is required by City & Guilds.

Malpractice

Tutors should inform learners of the JCQ Regulations concerning malpractice.

Learners must not:

- submit work which is not their own
- lend work to other learners
- allow other learners access to, or the use of, their own independently-sourced material (this does not mean that learners may not lend their books to another learner, but learners should be prevented from plagiarising other learners' research)
- include work copied directly from books, the Internet or other sources without acknowledgement or an attribution
- submit work typed or word processed by a third person without acknowledgement.

These actions constitute malpractice, for which a penalty (eg disqualification from the examination) will be applied. If malpractice is suspected, the Examinations Officer should be consulted about the procedure to be followed.

Where suspected malpractice in internally assessed work is identified by a centre after the learner has signed the declaration of authentication, the Head of Centre must submit full details of the case to City & Guilds at the earliest opportunity. The form, JQM/M1, should be used. Copies of the form can be found on the JCQ website: <http://www.jcq.org.uk>

Malpractice in internally assessed work discovered prior to the learner signing the declaration of authentication need not be reported to City & Guilds, but should be dealt with in accordance with the centre's internal procedures. City & Guilds would expect centres to treat such cases very seriously. Details of any work which is not the learner's own must be recorded on the cover sheet or other appropriate place.

Factors affecting individual learners

Tutors should be able to accommodate the occasional absence of learners by ensuring that the opportunity is given for them to make up missed assessments.

If work is lost, City & Guilds should be notified immediately of the date of the loss, how it occurred, and who was responsible for the loss. Centres should use the JCQ form, JCQ/LCW, to inform City & Guilds Candidate Support of the circumstances.

Learners who move from one centre to another during the course may require individual attention. Possible courses of action depend on the stage at which the move takes place. If the move occurs early in the course, the new centre should take responsibility for assessment. If it occurs late in the course it may be possible to arrange for the moderator to assess the work through the 'Educated Elsewhere' procedure. Centres should contact City & Guilds at the earliest possible stage for advice about appropriate arrangements in individual cases.

6 Administration

Quality assurance

Quality assurance of assessments

Centres must use the provided documentation, unless otherwise agreed, to ensure that all of the appropriate information is available for moderation processes. Centres may devise additional documentation/forms to support those provided by City & Guilds.

If a learner's work is selected for external moderation, samples of work must be made available as detailed in the moderation handbook.

Internal quality assurance

Registered centres must have effective quality assurance systems to ensure optimum delivery and assessment of qualifications. Quality assurance includes initial centre registration by City & Guilds and the centre's own internal procedures for monitoring quality. Centres are responsible for internal quality assurance and City & Guilds is responsible for external quality assurance.

Standards and rigorous quality assurance are maintained by the use of:

- internal quality assurance
- City & Guilds external moderation.

In order to carry out the quality assurance role, Internal Quality Assurers must have appropriate teaching and vocational knowledge and expertise. For more information on the requirements, refer to Section 2 of this handbook.

To meet the quality assurance criteria for this qualification, the centre must ensure that the following procedures are followed:

- the setting of the internally set and marked assessment against the specification
- training in the use of the assessment grids
- completion by the person responsible for internal standardisation of the Centre Declaration Sheet to confirm that internal standardisation has taken
- the completion by learners and supervisors/assessors of the record form for each learner's work.

External quality assurance

External quality assurance is provided by the two stage moderation system described in Section 6. External moderation of internally assessed work is carried out to ensure that assessment is valid and reliable, and that there is good assessment practice in centres and that standards are maintained.

In order to carry out their quality assurance role, external moderators must have appropriate teaching and vocational knowledge and expertise. City & Guilds will appoint external moderators and will ensure that they attend regular training and development meetings designed to keep them up to date, to ensure standardisation of all assessments and to share good practice.

External moderators will:

- provide advice and support to staff in centres
- ensure the quality and consistency of assessments within and between centres and over time by the use of systematic sampling

- regularly visit centres to ensure that they continue to meet the centre registration requirements of City & Guilds
- provide feedback to centres and to City & Guilds.

City & Guilds requires the Head of Centre to:

- facilitate any inspection of the Centre which is undertaken on behalf of City & Guilds
- make secure arrangements to receive, check and keep examination material secure at all times, maintain the security of City & Guilds confidential material from receipt to the time when it is no longer confidential and keep scripts secure from the time they are collected from the candidates to their dispatch to City & Guilds.

Awarding grades and reporting results

This qualification is graded Pass/Merit/Distinction/Fail. The qualification grade will be determined by the grade achieved in the 301 assessment.

Boundaries for this assessment are given below;

	Pass	Merit	Distinction
Mark	24	29	34
Percentage (%)	60	73	85

Enquiries about results

The services available for enquiries about results include a clerical check and re-moderation of internally assessed work. Requests must be submitted within the specified period after the publication of results for individual assessments.

In cases where a post-results enquiry reveals inaccurate assessment, the result may be confirmed, raised or lowered.

For further details of enquiries about results services, please consult the current version of the JCQ Post-Results Services booklet.

Re-sits and shelf-life of assessment results

Assessment results remain available to count towards certification, whether or not they have already been used, as long as the specification is still valid.

Learners who have failed an assessment or wish to re-take it in an attempt to improve their grade, can re-sit this assessment, provided they are given a different version of the assessment to what they originally sat.

Access arrangements and special consideration

We have taken note of the provisions of equalities legislation in developing and administering this specification.

We follow the guidelines in the Joint Council for Qualifications (JCQ) document: Regulations and Guidance Relating to Candidates who are Eligible for Adjustments in Examination GCSE, GCE, GNVQ, AEA, Entry Level, Basic Skills & Key Skills Access Arrangements and Special Consideration. This is published on the JCQ website: http://www.jcq.org.uk/access_arrangements/

Access arrangements

We can make arrangements so that learners with disabilities, special educational needs and temporary injuries can access the assessment. These arrangements must be made before the examination. For example, we can produce a Braille paper for a learner with visual impairment.

Special consideration

We can give special consideration to learners who have had a temporary illness, injury or indisposition at the time of the examination. Where we do this, it is given after the examination.

Applications for either access arrangements or special consideration should be submitted to City & Guilds by the Examinations Officer at the centre.

Language of examinations

We will provide this specification in English only.

Other issues

European Dimension

City & Guilds has taken account of the 1988 Resolution of the Council of the European Community in preparing this specification and associated specimen units.

Environmental Education

City & Guilds has taken account of the 1988 Resolution of the Council of the European Community and the Report Environmental Responsibility: An Agenda for Further and Higher Education 1993 in preparing this specification and associated specimen units.

Avoidance of bias

City & Guilds has taken great care in the preparation of this specification and specimen units to avoid bias of any kind.

7 Units

Availability of units

Structure of the units

These units each have the following:

- City & Guilds reference number
- Title
- Level
- Guided learning hours (GLH)
- Learning outcomes, which are comprised of a number of assessment criteria

Centres must deliver the full breadth of the range. Specialist equipment or commodities may not be available to all centres, so centres should ensure that their delivery covers their use. This may be covered by a practical demonstration (e.g. video). For the practical assessments for this qualification, centres should ensure that there are sufficient resources to complete the task but are not required to use all the equipment or commodities in the range.

Unit 301 Fundamentals of BIM

Unit level:	Level 3
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GLH:	10
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What is this unit about?

Construction is a significant contribution to the UK economy representing around 10% of GDP and employing 3 million people across the industry. However, ways of working are inefficient, wasteful and don't always result in the desired outcomes. BIM provides a once in a lifetime opportunity for dramatic sustainable transformation, making use of technology and reforms in working practices to achieve significant economic and social benefits.

Through this unit, learners will gain knowledge of fundamental concepts associated with BIM; from knowledge of key terminology to the principles and standards associated with BIM implementation in the UK. They will develop an understanding of the drivers leading to BIM implementation, the barriers to success and the benefits that can be gained.

Learning outcomes

In this unit, learners will be able to

- 1 Understand the fundamentals of BIM
- 2 Understand the purpose of BIM

Scope of content

Learning outcome

- 1 Understand the fundamentals of BIM
-

Topics

- 1.1 Key terms
- 1.2 BIM principles
- 1.3 Maturity levels
- 1.4 Standards
- 1.5 Technology

Depth

Topic 1.1

Key terms

Learners will know the definitions of key terms relating to BIM and their use within the information delivery cycle

- Common Data Environment (CDE)
- Soft landings
- Digital plan of work
- Project Information Modelling (PIM)
- Asset Information Modelling (AIM)
- COBie
- Employer's Information Requirements (EIR)
- BIM Execution Plan (BEP)
- BIM Protocol
- Employer within the supply chain.

Topic 1.2

BIM principles

Learners will need to know the BIM principles and understand how they apply in practice in different types of construction projects

- Collaborative working
- Communication
- Information modelling
- Information management
- Standard definitions and common approaches
- Whole life/whole estate approach
- Security minded approach
- Information delivery cycle.

Topic 1.3

Maturity levels

Learners will need to know the content of the Bew-Richards Maturity diagram.

Learners will know the characteristics of maturity levels 0-3 and the currently expected level of maturity for the industry.

Topic 1.4

Standards

Learners will know the focus of British Standards relating to BIM

- BS8536
- BS1192 suite.

Topic 1.5

Technology

Learners will understand the importance of technology to the successful implementation of BIM to

- Create information
- Manage information
- Exchange information
- Analyse information
- Publish/produce information
- Collaborate

They will also understand the relationship between technology, BIM principles and maturity levels.

Learning outcome

- 2 Understand the purpose of BIM

Topics

- 2.1 Drivers for change
- 2.2 Enabling factors
- 2.3 Benefits to key stakeholders
- 2.4 Barriers to successful implementation of BIM

Depth

Topic 2.1

Drivers for change

Learners will understand the challenges to the industry of traditional ways of working.

Learners will understand the drivers that have led to the development of BIM including

- Inefficiency
- Waste
- Environmental
- Competitive pressure
- Health and safety.

Learners will understand the role of the government as an initiator of change.

Topic 2.2

Enabling factors

Learners will understand the factors that have enabled the implementation of BIM and new ways of working in the construction industry.

Enablers include

- Technology
- Clear definition of BIM
- Government strategy
- Passionate individuals.

Topic 2.3

Benefits to key stakeholders

Learners will understand who are the key stakeholders of construction and the built environment

- Government
- Client
- End user
- Industry
- Society

Learners will understand how these recipients benefit from using BIM.

Topic 2.4

Barriers to successful implementation of BIM

Learners will understand the factors that could prevent successful BIM implementation and how these can be overcome.

These factors include

- Initial costs
- Lack of awareness
- Resistance to change
- Organisational culture
- Attitude to risk
- Short term thinking
- Commercial arrangements
- Organisational structures
- Lack of investment in education and training
- Lack of investment in research and development.

Appendix 1 Relationships to other qualifications

Links to other qualifications

Centres are responsible for checking the different requirements of all qualifications they are delivering and ensuring that candidates meet requirements of all units/qualifications.

Literacy, language, numeracy and ICT skills development

This [these] qualification[s] can develop skills that can be used in the following qualifications:

- Functional Skills (England) – see www.cityandguilds.com/functionalskills
- Essential Skills (Northern Ireland) – see www.cityandguilds.com/essentialskillsni
- Essential Skills Wales – see www.cityandguilds.com/esw

Appendix 2 Sources of general information

The following documents contain essential information for centres delivering City & Guilds qualifications. They should be referred to in conjunction with this handbook. To download the documents and to find other useful documents, go to the Centres and Training Providers homepage on www.cityandguilds.com.

Centre Manual - Supporting Customer Excellence contains detailed information about the processes which must be followed and requirements which must be met for a centre to achieve 'approved centre' status, or to offer a particular qualification, as well as updates and good practice exemplars for City & Guilds assessment and policy issues.

Specifically, the document includes sections on:

- The centre and qualification approval process
- Assessment, internal quality assurance and examination roles at the centre
- Registration and certification of candidates
- Non-compliance
- Complaints and appeals
- Equal opportunities
- Data protection
- Management systems
- Maintaining records
- Assessment
- Internal quality assurance
- External quality assurance.

Our Quality Assurance Requirements encompasses all of the relevant requirements of key regulatory documents such as:

- SQA Awarding Body Criteria (2007)
- NVQ Code of Practice (2006)

and sets out the criteria that centres should adhere to pre and post centre and qualification approval.

Access to Assessment & Qualifications provides full details of the arrangements that may be made to facilitate access to assessments and qualifications for candidates who are eligible for adjustments in assessment.

The **centre homepage** section of the City & Guilds website also contains useful information on such things as:

- **Walled Garden:** how to register and certificate candidates on line
- **Events:** dates and information on the latest Centre events
- **Online assessment:** how to register for e-assessments.

Centre Guide – Delivering International Qualifications contains detailed information about the processes which must be followed and requirements which must be met for a centre to achieve 'approved centre' status, or to offer a particular qualification.

Specifically, the document includes sections on:

- The centre and qualification approval process and forms
- Assessment, verification and examination roles at the centre
- Registration and certification of candidates

- Non-compliance
- Complaints and appeals
- Equal opportunities
- Data protection
- Frequently asked questions.

Appendix 3 Useful contacts

UK learners General qualification information	E: learnersupport@cityandguilds.com
International learners General qualification information	F: +44 (0)20 7294 2413 E: intcg@cityandguilds.com
Centres Exam entries, Certificates, Registrations/enrolment, Invoices, Missing or late exam materials, Nominal roll reports, Results	F: +44 (0)20 7294 2413 E: centresupport@cityandguilds.com
Single subject qualifications Exam entries, Results, Certification, Missing or late exam materials, Incorrect exam papers, Forms request (BB, results entry), Exam date and time change	F: +44 (0)20 7294 2413 F: +44 (0)20 7294 2404 (BB forms) E: singlesubjects@cityandguilds.com
International awards Results, Entries, Enrolments, Invoices, Missing or late exam materials, Nominal roll reports	F: +44 (0)20 7294 2413 E: intops@cityandguilds.com
Walled Garden Re-issue of password or username, Technical problems, Entries, Results, e- assessment, Navigation, User/menu option, Problems	F: +44 (0)20 7294 2413 E: walledgarden@cityandguilds.com
Employer Employer solutions, Mapping, Accreditation, Development Skills, Consultancy	T: +44 (0)121 503 8993 E: business@cityandguilds.com
Publications Logbooks, Centre documents, Forms, Free literature	F: +44 (0)20 7294 2413

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City & Guilds Group

The City & Guilds Group is a leader in global skills development. Our purpose is to help people and organisations to develop their skills for personal and economic growth. Made up of City & Guilds, City & Guilds Kineo, The Oxford Group and ILM, we work with education providers, businesses and governments in over 100 countries.

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