

GCE
AS/A
LEVEL

APPROVAL CRITERIA

Built Environment

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This is a **Regulatory Document** under **Condition B7** of the *Standard Conditions of Recognition: Compliance with Regulatory Documents*¹.

¹ <https://qualificationswales.org/english/publications/standard-conditions-of-recognition/>

Introduction

This document sets out the approval criteria for GCE Built Environment. These have been developed by Qualifications Wales with the support of many stakeholders. They set out the requirements that an awarding body must address when developing the specification and assessment materials for GCE AS and A levels in this subject.

The approval criteria in this document will come into effect from August 2019.

Qualifications Wales will only approve a qualification that meets all of the requirements set out in this document together with those set out in the *Approval Criteria for GCE AS and A Level Qualifications*², our *Standard Conditions of Recognition*³ and our *Additional Standard Conditions of Recognition for GCSE/GCE Qualifications*⁴. In developing qualifications to meet these requirements awarding bodies must have regard to *Fair Access by Design*⁵.

Where the requirements of the Subject Approval Criteria set out in this document differ from those prescribed in the *Approval Criteria for GCE AS and A Level Qualifications*, the *Standards Conditions of Recognition* and the *Additional Standard Conditions of Recognition for GCSE/GCE Qualifications*, the requirements in this document will take precedence.

The rationale referenced within this document is required in addition to the rationale required in the *Approval Criteria for GCE AS and A Level Qualifications*.

This qualification may be made available for first teaching from September 2022 with the first opportunity for full certification in summer 2024.

² <https://qualificationswales.org/english/publications/qualification-approval-criteria---as-a-levels/>

³ <https://qualificationswales.org/english/publications/standard-conditions-of-recognition/>

⁴ <https://qualificationswales.org/english/publications/additional-standard-conditions-of-recognition-for-gcse-gce-qualifications/>

⁵ <https://www.qualificationswales.org/media/4739/fair-access-by-design.pdf>

Purpose

GCE AS/A level Built Environment advances learners' understanding of the built environment, including of the professional and technical roles within it and the range of buildings, assets and structures that comprise it. The qualification allows learners to develop a deep understanding of the interrelated practices involved at each stage in the building life cycle, as well as of the scientific and mathematic principles required to understand the composition of the built environment. Learners will develop a wide range of technical and practical skills involved in the design, construction, use and maintenance of the built environment, considering the way that the built environment meets the needs of users, clients and stakeholders.

The qualification may be taken by those who have previously studied GCSE Built Environment or those that are interested in developing new skills in this subject area. The qualification will be of particular value to those with an interest in entering a technical or professional role in the built environment or continuing their studies in this subject area in higher education. It is, nonetheless, designed to appeal to a broad range of learners with different interests and may complement the study of a wide range of other subjects, including mathematics, physics, geography, design and technology, economics, business studies, art and design, history and geology.

RR1 – Rationale requirement: *on submitting the specification for approval by Qualifications Wales the awarding body will need to provide rationale of how the specification fulfils the purpose of the qualification.*

RR2 – Rationale requirement: *on submitting the specification the awarding body will need to provide rationale of how the specification addresses the findings of Building the Future, Chapter 7: Qualifications taken primarily in schools and Chapter 13, Option A2 (p.77)⁶. Building the Future is Qualifications Wales' review of qualifications and the qualification system in the construction and built environment sector.*

⁶ <https://www.qualificationswales.org/media/3176/building-the-future.pdf>

Subject aims and objectives

1. GCE Built Environment specifications must enable learners to develop:
 - 1.1. Knowledge and understanding of the stages and processes involved in the built environment life cycle;
 - 1.2. Knowledge and understanding of the professional and technical roles involved in the built environment;
 - 1.3. Knowledge and understanding of the built environment needs of clients and stakeholders;
 - 1.4. Knowledge and understanding of building information modelling (BIM) practices and the role of BIM software in all stages of the built environment life cycle;
 - 1.5. Knowledge and understanding of sustainability issues and sustainable practices in the built environment life cycle;
 - 1.6. Knowledge and understanding of the changing nature of practice in the built environment sector over time and during different periods;
 - 1.7. Skills in planning, developing, managing and evaluating built environment projects;
 - 1.8. Skills in designing built environment concepts that meet client and stakeholder needs.

Subject content

2. The subject content of GCE Built Environment specifications must meet the subject aims and objectives and include the content set out for each unit in paragraph 3.
3. The subject content must be split into the following units of study at AS:
 - 3.1 **Unit 1:** Our Built Environment;
 - 3.2 **Unit 2:** Design and Planning Practices;and at A2:
 - 3.3 **Unit 3:** Materials, Technologies and Techniques;
 - 3.4 **Unit 4:** Construction Practices.

Unit 1 – Our Built Environment (20%)

4. In Unit 1, GCE Built Environment specifications must require learners to develop knowledge and understanding of the following learning areas:

Learning Area	Content
The life cycle of buildings and structures	The stages in the life cycle of buildings and structures, from strategic definition to demolition/repurposing.
Low- and high-rise structures in the built environment	<ul style="list-style-type: none"> • Types of structures. • Features of these structures. • Uses and purposes of these structures.
Professional and technical careers and roles in the built environment	<ul style="list-style-type: none"> • Architecture. • Civil and structural engineering. • Surveying. • Site and project management. • Quantity surveying. • Town planning. • Building services engineering.
Organisations in the built environment	<ul style="list-style-type: none"> • Small- and medium-sized enterprises. • Nationwide and global companies. • Contracting and sub-contracting. • Tendering processes and procurement exercises, and relevant rules and legislation, including the Modern Slavery Act 2015. • Local authority planning departments. • Trade and industry training bodies. • Trade registration and development schemes.
Structures of low-rise domestic and commercial buildings	<ul style="list-style-type: none"> • The structural forms created both on-site and off-site. • The advantages and disadvantages of different structure types. • Traditional (pre-1919) structure types. • Modular construction.
Designing and constructing	<ul style="list-style-type: none"> • Methods for investigating subsoil. • Producing information for foundation design.

substructures (in contemporary practice)	<ul style="list-style-type: none"> • Methods for improving subsoil. • The types of building foundation. • Principles for designing foundations. • Basement excavation, retaining walls and damp-proof courses.
Designing and constructing superstructures (in contemporary practice)	<ul style="list-style-type: none"> • Types of ground floor construction. • Types of intermediate floor construction. • Designing stairs and open spaces. • Types of internal wall and partitioning. • External walls and cladding. • Designing openings in walls. • Finishing floors and ceilings.
Designing the services requirements for buildings (in contemporary practice)	<ul style="list-style-type: none"> • Services requirements for different types of buildings. • The design of services at different points in the construction process.
Change of use	<ul style="list-style-type: none"> • Altering, refurbishing and extending existing buildings. • Issues of compatibility and using consistent materials. • Including pre-1919 buildings and structures.
External works	<ul style="list-style-type: none"> • Foul and surface water drainage. • Sustainable urban drainage systems. • Installation/distribution of utility services. • Methods for creating footpaths and roads.

RR3 – Rationale requirement: on submission of the specification awarding bodies will be required to explain the reason(s) for including any additional content that is not listed above.

Unit 2 – Design and Planning Practices (20%)

5. In Unit 2, GCE Built Environment specifications must require learners to develop knowledge and understanding of, and skills in, the following learning areas:

Learning Area	Content
Stages involved in the design process	<ul style="list-style-type: none"> • Stages 0 – 4 of the RIBA Plan of Work⁷. • The activities undertaken at each of these stages.
Factors, including legislation and government policy, that influence the design process for buildings and assets	<ul style="list-style-type: none"> • Site information and constraints. • Planning parameters and constraints. • Statutory requirements and constraints. • Environmental requirements and constraints. • Social requirements and constraints. • Budgetary and economic constraints. • Construction (Design and Management) regulations.
Initial project briefs	<ul style="list-style-type: none"> • Setting parameters of projects in relation to the factors that influence the design of buildings and assets. • Setting project outcomes. • Outlining possible design ideas and specifications. • Writing briefs for a specific and intended audience.
Producing designs	<ul style="list-style-type: none"> • A range of 2D and 3D sketches and drawings. • The techniques, principles and conventions of manual drawing. • Technical, component and material annotations.
Virtual modelling design	<ul style="list-style-type: none"> • Use of 2D and 3D virtual modelling outputs to produce different project information. • Setting up virtual modelling projects and using common methodologies. • Producing virtual models and rendering.
Planning construction methods and techniques	<ul style="list-style-type: none"> • The primary and secondary requirements of low- and medium-rise buildings.

⁷ RIBA Plan of Work 2013, <https://www.ribaplanofwork.com/PlanOfWork.aspx>, or the most up to date version of this document.

	<ul style="list-style-type: none">• The requirements for working with buildings from different periods.• Contemporary construction methods for substructures and superstructures.• Sustainable construction methods, techniques and considerations.• Water and waste water systems design and construction.• Landscape design.• Site design.
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RR4 – Rationale requirement: *on submission of the specification awarding bodies will be required to explain the reason(s) for including any additional content that is not listed above.*

Unit 3 – Materials, Technologies and Techniques (30%)

6. In Unit 3, specifications for GCE Built Environment must require learners to develop knowledge and understanding of, and skills in, the following learning areas, but not be limited to them:

Learning Area	Content
Properties of materials	<ul style="list-style-type: none"> • The properties that define the uses and purposes of materials. • The ways that materials may respond to changing conditions and situations. • The factors that cause material degradation.
Properties of construction materials	<ul style="list-style-type: none"> • The properties of common materials used in construction processes. • The ways in which common materials are manufactured/processed before use. • The ways in which changing temperatures affect construction materials. • The load-bearing properties of construction materials.
Degradation of construction materials	<ul style="list-style-type: none"> • The causes of material degradation. • Measures involved in preventing and reducing degradation. • Solving issues caused by material degradation. • Impact on the environment.
Mathematical and statistical methods and techniques used during the life-cycle of buildings and assets	<ul style="list-style-type: none"> • Algebraic techniques: <ul style="list-style-type: none"> ○ Addition, subtraction, multiplication and division ○ Brackets and factors ○ Powers, indices and roots ○ Sequences ○ Rearranging formulae ○ Simultaneous equations ○ Quadratic equations. • Graphical techniques: <ul style="list-style-type: none"> ○ Polar and Cartesian co-ordinates

	<ul style="list-style-type: none"> ○ Axes, gradients and equations of graphs and areas under graph lines ○ Best-fit lines and interpolation ○ Extrapolation ○ Straight line graphs and using them to solve quadratic equations ○ Solving simultaneous linear, quadratic and cubic equations graphically (including the use of the binomial theorem). ● Geometric techniques: <ul style="list-style-type: none"> ○ Properties of angles and lines (radians and degrees) ○ Pythagoras' theorem ○ Circles: circumference, perimeter, area, sector areas. ○ Triangles: right-angle and non-right-angle trigonometry, area, trigonometric ratios. ● Mensuration: <ul style="list-style-type: none"> ○ Area and perimeter formulae of 2D shapes ○ Volume and surface area formulae for 3D objects ○ Area, volume and surface area of non-standard (irregular or compound) shapes ○ Centre line calculations. ● Statistical techniques and data: <ul style="list-style-type: none"> ○ Types of data and forms and methods of presenting data ○ Calculating averages and understanding cumulative frequency and standard deviation of data.
Applications of mathematical techniques	<ul style="list-style-type: none"> ● Structural analysis of buildings/assets. ● Impact of temperature changes on building users. ● Calculating impacts of material properties on building acoustics and sounds. ● Determining the designs required for lighting in buildings/assets.
Standards for measurements	<ul style="list-style-type: none"> ● The rules of measurement affecting the planning of construction, installation and maintenance projects. ● The rules of measurement for civil engineering projects.

	<ul style="list-style-type: none"> • Producing quantities for substructures and superstructures. • Producing quantities for civil engineering projects. • Producing bills of quantities for building/asset projects.
Thermal comfort	<ul style="list-style-type: none"> • The scientific principles required to understand the factors affecting the thermal comfort of buildings. • Controlling and managing heat. • Moisture risks to buildings, including condensation, and approaches to moisture management.
Acoustic design of buildings and assets	<ul style="list-style-type: none"> • The scientific/mathematic principles required to understand the way that sound is measured. • How sound is managed throughout the life-cycle of buildings/assets. • The implications of sound design on building users and others.
Lighting in buildings and of assets	<ul style="list-style-type: none"> • The types of light, both natural and artificial, which affect building/asset users. • The methods of measuring light in buildings and of assets.
Building services systems	<ul style="list-style-type: none"> • The nature of energy and its use in building services systems. • The energy forms used in electrical, air conditioning, refrigeration and heating systems. • The units, calculations and methods of calculating energy use and requirements. • The links between structural design and energy consumption. • Active and passive building services engineering design. • The benefits of collaborative use of BIM when designing structures and building services systems.

RR5 – Rationale requirement: on submission of the specification awarding bodies will be required to explain the reason(s) for including any additional content that is not listed above.

Unit 4 – Construction Practices (30%)

7. In Unit 4, specifications for GCE Built Environment must include the content below. It must allow learners to choose either Section 1 or Section 2, and require all learners to complete Sections 3-6. It must also require learners to apply knowledge, skills and understanding from Units 1, 2 and 3.

Section 1 – Building surveying of commercial or residential properties	
Learning Area	Content
Residential and commercial properties	<ul style="list-style-type: none"> • The different types of commercial and residential properties in the built environment. • The architectural styles (and periods) in which commercial and residential properties are/have been built. • The impact of style and type on future maintenance.
The maintenance implications created by traditional and modern methods of constructing residential properties	<ul style="list-style-type: none"> • Foundations. • Solid and hollow walls. • Rooves. • Solid and suspended floors. • Doors, windows and glazing.
Common defects to external envelopes of residential properties and suitable means of repair or renewal	<ul style="list-style-type: none"> • Foundations. • Walls. • Rooves. • Chimneys. • Drainage and rainwater disposal systems. • Doors and windows.
Common internal defects of residential properties and suitable means of repair or renewal	<ul style="list-style-type: none"> • Ground floors. • Upper floors. • Ceilings. • Walls. • Stairs and openings. • Drainage and rainwater disposal systems.
Undertaking a building survey	<ul style="list-style-type: none"> • The stages involved in inspecting properties. • The requirements of reporting surveying findings.

	<ul style="list-style-type: none"> • The requirements for measured surveys. • Producing survey drawings. • The inter- and intra-personal skills required in undertaking a building survey on a residential property.
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Section 2 – Surveying land	
Learning Area	Essential Content
Linear, levelling and angular measurements	<ul style="list-style-type: none"> • Purpose and development of survey frameworks. • Measuring horizontal and sloped distances. • Traverse types in surveying. • The purposes, principles and methods of levelling. • The mathematical principles used in conducting the critical content above.
Fieldwork surveys equipment	<ul style="list-style-type: none"> • Manual, electronic and technological equipment. • Interpreting the results of fieldwork surveys. • The mathematical principles required when using the above equipment.
Errors	Identifying, understanding and rectifying: <ul style="list-style-type: none"> • Human/gross errors • Systematic equipment errors • Random errors.
Undertaking fieldwork surveys	<ul style="list-style-type: none"> • Linear surveys. • Levelling surveys. • Reading and recording angles on a closed traverse. • The mathematical principles required when carrying out the above tasks.
Drawings of completed fieldwork surveying	<ul style="list-style-type: none"> • The conventions and notation required in developing drawings. • Plotting survey lines accurately. • Cross sections and long sections.

Section 3 – Development concepts

Learning Area	Essential Content
Converting, adapting and changing the use of buildings or land	<ul style="list-style-type: none">• Investigating and evaluating alternative uses for buildings or development land.• The factors influencing the conversion, adaptation or change of use of buildings or development land.• The processes and legislative requirements involved.• Feasibility reports.• Working drawings for proposed ideas.• Planning the use of materials that will meet development aims and user needs, including building safety requirements.

Section 4 – Construction management

Learning Area	Essential Content
Effective management	<ul style="list-style-type: none">• Management and leadership styles.• Project management teams: roles, responsibilities, interdependencies and decision-making roles.• Uses of BIM technologies.• Contingency planning.
Resource planning	<ul style="list-style-type: none">• Cash flow.• Ordering and scheduling material deliveries.• Human resource requirements, including health and safety needs.• Plant resource needs.• Site storage.• Supervision of workforce and quality assurance of output.
Handover	<ul style="list-style-type: none">• RIBA Plan of Work Stages 6 and 7.• Commissioning building services installations.• Health and safety files.• Handover period.• The completion period and client feedback.

Construction management techniques	<ul style="list-style-type: none"> • Master programmes such as lines of balance, Gantt charts and critical path analyses. • Risk assessments and method statements (RAMS). • Quality assurance systems and testing methods. • Management of human resources and sub-contractors.
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Section 5 – Purchasing and financial management

Learning Area	Essential Content
Purchasing methods	<ul style="list-style-type: none"> • Suitable and reliable suppliers. • Seeking and evaluating quotations for materials and sub-contractors. • Evaluating and managing delivery lead times and managing just-in-time delivery models. • Purchasing locally, sustainably, ethically and in a socially responsible way. • Fixed, single and serial contracts. • Using purchase orders.
Costs and taking off quantities	<ul style="list-style-type: none"> • Materials. • Labour. • Cost value comparisons. • Managing costs/cost savings.
Bill of quantities	<ul style="list-style-type: none"> • Preliminary items. • Prices. • Units and dimensions. • New Rules of Measurement.

Section 6 – Programme of activities

Learning Area	Essential Content
Producing programmes of activities	<ul style="list-style-type: none"> • Selecting the most appropriate master programme. • RAMS. • Site layout. • Site storage. • Visual monitoring tools.

	<ul style="list-style-type: none"> • Site traffic management plans. • Waste management plans.
Ensuring progress	<ul style="list-style-type: none"> • The causes of delays and the impacts they have on projects. • Overcoming delays. • Facilitating ahead-of-schedule progress. • Adopting and adapting contingency plans.

RR6 – Rationale requirement: *on submission of the specification awarding bodies will be required to explain the reason(s) for including any additional content that is not listed above.*

Assessment objectives

8. The assessment of the knowledge, understanding and skills required in GCE Built Environment specifications must target the following assessment objectives and specifications must identify the exact weighting of each assessment objective, at AS and at A2, which must be within the ranges indicated below.

		AS	A2	A level
AO1	Demonstrate knowledge and understanding of the built environment, including the roles, practices and materials involved in its design, construction, use and maintenance.	35-40%	25-30%	25-30%
AO2	Apply knowledge and understanding of the built environment and of the processes, stages, needs, roles and materials involved in its design, construction, use and maintenance.	35-40%	35-40%	35-40%
AO3	Plan, develop and evaluate built environment projects that: <ul style="list-style-type: none"> • meet the business, development and user needs; • at A2, demonstrate skills in investigating the built environment, recording and reporting findings using appropriate methods. 	25-30%	30-35%	30-35%

Scheme of assessment

9. GCE Built Environment specifications must meet the following assessment arrangements:

Unit	Arrangements
Unit 1: Our Built Environment	Unit 1 must: <ul style="list-style-type: none"> • be assessed by examination; • be set and marked by the awarding body.
Unit 2: Design and Planning Practices	Unit 2 must: <ul style="list-style-type: none"> • be assessed through non-examination assessment; • require learners to respond to a contextualised brief set by the awarding body; • require learners to undertake a practical project in which tangible outcomes are produced; • include planning, practical and evaluation stages in the project.
Unit 3: Materials, Technologies and Techniques	Unit 3 must: <ul style="list-style-type: none"> • be assessed by examination; • be set and marked by the awarding body.
Unit 4: Construction Practices	Unit 4 must: <ul style="list-style-type: none"> • be assessed through non-examination assessment; • require learners to undertake a building survey <i>or</i> a land survey; • require learners to produce a development concept based on their survey findings; • require learners to produce subsequent construction management information, purchasing and financial management information and a programme of activities based on their development concept.

RR7 – Rationale requirement: on submission of the specification awarding bodies will be required to explain the ways in which the scheme of assessment balances the considerations of manageability, engagement, reliability and validity, including how:

- the assessment arrangements are, overall, manageable for both centres and learners;

- *the assessment arrangements are, overall, sufficiently engaging for learners and promote and sustain learners' interest in the subject area;*
- *the assessment arrangements will ensure the reliability of assessment outcomes, at centre and national level and over time, for example by identifying and describing:*
 - *the controls which will be applied to candidates and centres during non-examination assessment;*
 - *the means of ensuring that centres carry out varied non-examination assessment tasks year on year;*
 - *the forms of presentation which may be used by candidates when undertaking non-examination assessment;*
 - *the way in which marking criteria will be set for use by teachers and examiners;*
 - *how examination assessments will be conducted;*
- *the assessment arrangements are a valid form of assessment for the skills, knowledge and understanding being assessed.*

10. GCE A level Built Environment specifications must ascribe 20% weighting to Unit 1 – Our Built Environment (and 50% at AS level).

11. GCE A level Built Environment specifications must ascribe 20% weighting to Unit 2 – Design and Planning Practices (and 50% at AS level).

12. GCE A level Built Environment specifications must ascribe 30% weighting to Unit 3 – Materials, Technologies and Techniques.

13. GCE A level Built Environment specifications must ascribe 30% weighting to Unit 4 – Construction Practices.