Level 6 Diploma in Advanced Project Controls Practice and Techniques (RQF)

Qualification Specification

Contains the following qualification pathways:

- Estimating
- Planning and scheduling
- Cost engineering
- Integrated project controls practice

Contents

Introduction

Objective and overview

This document details the learning outcomes and assessment criteria that a candidate must meet in order to demonstrate acquisition of the knowledge and skills to be awarded an ECITB Level 6 Diploma in Advanced Project Controls practice and techniques (RQF).

Attainment in this vocational qualification is an endorsement of the candidate's competence and ability to be effective in or progress into a lead or management role within their chosen project controls-related discipline.

To support a candidate's development in their chosen project controls-related discipline, this vocational qualification contains four pathways. The candidate is required to select **ONLY ONE** pathway when registering on the qualification, and successful completion of the qualification pathway will lead to the candidate being awarded one of the following:

- ECITB Level 6 Diploma in Advanced Project Controls Practice and Techniques (RQF) – Estimating
- ECITB Level 6 Diploma in Advanced Project Controls Practice and Techniques (RQF) – Planning and Scheduling
- ECITB Level 6 Diploma in Advanced Project Controls Practice and Techniques (RQF) – Cost Engineering
- ECITB Level 6 Diploma in Advanced Project Controls Practice and Techniques (RQF) – Integrated Project Controls Practice.

Entry criteria

In order to achieve this qualification, a candidate must be working in a role within their selected qualification pathway and be able to generate the work-based evidence at the required level. A candidate's individual circumstances will determine if this qualification is appropriate, and the Approved Centre will work with the prospective candidate and where appropriate the employer to determine suitability for the qualification.

Due to the level and complexity of the subject, it is recommended that a candidate holds a minimum of GCSE grade C/5 in English Language and Mathematics, or RQF Functional Skills Level 2 or above in English (Language) and Mathematics, or equivalent, and meets one or more of the following criteria:

- is educated to A-Level/Level 3 standard, or equivalent
- holds an ECITB Level 3 Diploma in Project Control techniques and practice (RQF), or equivalent qualification
- possesses relevant professional experience.

Assessment strategy and methodology

Candidates will be assessed by an Approved Assessor at an ECITB Approved Centre, Approved Centre assessment will be subject to quality assurance in line with ECITB's published Centre Assessment Scrutiny and External Quality Assurance Strategy.

Assessment methods for this qualification are portfolio of work-based evidence, technical discussions with and presentation to an ECITB Approved Assessor.

Candidates are required to compile a portfolio of work-based evidence that demonstrates all the assessment criteria for each unit. A candidate must prepare and deliver a presentation to an ECITB Approved Assessor for Unit APC01 for Learning Outcome 1.6, Assessment Criteria 1.6.2.

The portfolio of evidence and presentation will be assessed by an ECITB Approved Assessor who will also use technical discussions with candidates to assess any relevant criteria as well as authenticate evidence and assess the candidates' underpinning knowledge and understanding.

A holistic approach to assessment is encouraged for this qualification in order to recognise the integrated nature and complexity of the skills being assessed. An ECITB Approved Assessor will agree with candidates the evidence items required for each of the assessment criteria.

The Approved Centre is responsible for ensuring that the candidate is able to generate work-based evidence to achieve this qualification for their selected pathway. In circumstances which the ECITB Awarding Organisation (AO) deem to be exceptional, and for a limited number of assessment criteria, where a candidate is not able to provide work-based evidence items for any assessment criteria, this must be discussed with the AO. It may be possible that these criteria could be evidenced by way of a centre-devised simulation (subject to AO approval prior to any assessment taking place).

All assessment is carried out by assessors approved by the AO.

Recognition of prior learning (RPL)

Recognition of prior learning (RPL) is permitted for this qualification. Information on the RPL available for this qualification is specified within ECITB's *Recognition of Prior Learning Policy and Procedure* which can be downloaded from our website.

Equal opportunities, reasonable adjustments and special consideration

For information relating to fair assessment, equal opportunities, reasonable adjustments and special considerations, please refer to the *ECITB Reasonable Adjustment and Special Consideration Policy* which is available on the ECITB website.

Total qualification time, level and duration

Total qualification time (TQT) for this qualification is 971 hours, including 761 hours of guided learning. A breakdown distribution of these hours per unit is outlined in the table below. The amount of time taken to achieve this Level 6 Diploma is typically 42 months.

The candidate must register on a qualification pathway when registering on the qualification and complete all the following mandatory units and the specialist unit that relates to their selected pathway:

Units	**Guided learning (hours)**	**Total qualification time (hours)**
Mandatory units all pathways		
Unit APC01: Developing own professional competence	75	113
Unit APC02: Communicating to advise and influence project decisions	83	120
Unit APC03: Controlling uncertainties with project risk and assumption management	68	83
Unit APC04: Defining requirements and preparing a project controls plan	75	98
Unit APC05: Managing commercial and contractual arrangements	53	68
Unit APC06: Applying data-centric execution and analytics	38	45
Unit APC07: Applying optimisation and performance improvement	38	53
Unit APC08: Applying change control processes and management	38	53
Unit APC09: Monitoring and controlling progress and performance	120	135
Unit APC10: Forecasting to influence future conditions	45	60
Selected pathway units Each candidate must undertake only the one unit from the following which relates to their selected qualification pathway: <u>Estimating pathway</u> Unit APC11: Applying estimating practice to meet requirements <u>Planning and scheduling pathway</u> Unit APC12: Applying planning and scheduling practice to meet requirements <u>Cost engineering pathway</u> Unit APC13: Applying cost engineering practice to set budgets and cost baselines <u>Integrated project controls practice pathway</u> Unit APC14: Applying integrated project control practice	128	143
TOTAL HOURS	**761**	**971**

Achievement requirements for the qualification

To achieve this qualification, a candidate must complete 11 units – 10 mandatory and one pathway-specific unit. The candidate must successfully meet the requirements of the 11 units by demonstrating that they have met the requirements of each assessment criteria by providing evidence **within the context of their selected pathway.**

	Qualification pathway			
	Estimating	**Planning and scheduling**	**Cost engineering**	**Integrated project controls**
APC01 Developing own professional competence	✓	✓	✓	✓
APC02 Communicating to advise and influence project decisions	✓	✓	✓	✓
APC03 Controlling uncertainties with risk and assumption management	✓	✓	✓	✓
APC04 Defining requirements and preparing a project controls plan	✓			
APC05 Managing commercial and contractual arrangements	✓	✓	✓	✓
APC06 Applying data-centric execution and analytics	✓	✓	✓	✓
APC07 Applying optimisation and performance improvement	✓	✓	✓	✓
APC08 Applying change control processes and management	✓	✓	✓	✓
APC09 Monitoring and controlling progress and performance	✓			
APC10 Forecasting to influence future conditions	✓	✓	✓	✓

APC11 Applying estimating practice	Estimating pathway			
APC12 Applying planning and scheduling practice		Planning and scheduling pathway		
APC13 Applying cost engineering practice to set budgets and cost baselines			Cost engineering pathway	
APC14 Applying integrated project controls practice				Integrated project controls pathway

Career development within project controls

Successful completion of this qualification can support a candidate in their career progression into senior or lead project controls-related roles and management. These roles typically include Project Controls Manager, Lead Estimator, Lead Planner, Lead Cost Engineer. It can also support aspirations of moving into the more senior role in their career path of Head of Project Controls (or equivalent senior-level project controls-related role).

Evidence of attainment in the Level 6 Diploma in Advanced Project Controls practice and techniques may also support a candidate's registration for professional recognition with the ACostE in building a portfolio of evidence that may contribute towards registration for ICostE (Incorporated) or potentially towards CPCostE (Certified professional), and may provide evidence for some of the competence and commitment required for registration with the Engineering Council (subject to suitable engineering experience) as IEng (Incorporated Engineer) or potentially, CEng (Chartered Engineer).

For more information about career progression, visit the ECITB website www.ecitb.org.uk

Clarification of terms

Within this document, the following terms for which we thought it would be useful to provide clarification for here.

- Organisation – whenever we refer to an 'organisation', this can apply to any 'undertaking', including, for example, arrangements such as an alliance.
- Project control – where we refer to 'project control', 'project controls' or 'project control-related activities', a candidate should apply this as 'within the context of' estimating, planning/scheduling, cost engineering or integrated project controls, as appropriate to their selected qualification pathway.

Unit APC01: Developing own professional competence

Unit aim

On completing this unit, candidates will have demonstrated that they can manage their own continuing professional development and apply skills in current and emerging requirements of project control in the context of their selected pathway, specifically governance, continuous improvement, data analytics, and the drive towards carbon reduction and environmental sustainability.

Learning outcomes		Assessment criteria	
LO1.1	Formulate, maintain and review a personal professional development plan	S1.1.1	Determine own professional development needs (including monitoring the roadmap to achieving this qualification)
		S1.1.2	Establish personal and professional development goals
		S1.1.3	Recommend metrics to measure progress towards professional development goals
		S1.1.4	Review professional development against established goals, identify next steps and update development plan (including upon completion of this qualification)
LO1.2	Critique how project controls activities can be applied to support governance requirements	S1.2.1	Identify the governance applied to project controls within your organisation
		S1.2.2	Research and identify good practice in relation to governance for project controls
		S1.2.3	Evaluate the governance applied within your organisation compared with good practice identified and make recommendations for improvements
LO1.3	Make recommendations based on current good practice to support continuous improvement and lessons learned for project controls practice within your own organisation	S1.3.1	Source and identify good practice in project controls
		S1.3.2	Critique the quality of project controls practice within your organisation
LO1.4	Critique the approach taken to digital engineering and data analytics to underpin project controls delivery within your own organisation and recommend and justify improvements to achieve better control outcomes now and potentially in the future	S1.4.1	Examine the approach taken and level of maturity to digital engineering (eg Building Information Modelling and digital assets) and data analytics within your organisation to underpin project controls delivery
		S1.4.2	Research good practice in project controls relevant to your organisation for the following: • digital engineering environments in project control (eg Building Information Modelling and digital assets) • data analytics • machine learning

		S1.4.3	Identify potential opportunities where lessons learned from good practice in digital engineering or data analytics could be applied within your own organisation to improve practice
		S1.4.4	Present and justify the recommendations you have made, taking into account commercial considerations
LO1.5	Recommend project controls activities that could be implemented to support the drive towards net zero carbon/environmental sustainability	S1.5.1	Research and identify how from a project controls perspective you could support your organisation in the drive towards net zero carbon/environmental sustainability
		S1.5.2	Recommend actions you could take within the context of project controls to make a positive impact on the drive towards net zero carbon/environmental sustainability in your organisation, describing the requirements, and justify your recommendations in terms of the positive impact they may have
LO1.6	Produce and present a summary report of all recommendations made within unit APC01	S1.6.1	Prepare a report of relevant recommendations made from LO1.2 to LO1.5 and create a presentation to communicate these in a format suitable for your audience
		S1.6.2	Deliver the presentation of the report, including using presentation techniques, communication techniques, body language, eye contact and tone of voice

Underpinning Knowledge

Underpinning knowledge is not directly assessed; however, candidates will require the following underpinning knowledge to be able to successfully achieve the above Learning Outcomes:

- The importance of reflective thinking, self-development and improvement

- Personal and professional development plans
    - what they should include, including SMART targets and goals
    - how to maintain one
    - process for reviews
    - sources of feedback on performance and progress

- Application of improved dataflow, digital environments, data analytics and machine learning in relation to commercial considerations, existing maturity and competence within a company and the culture within the company

- Sources of support for personal and professional development, including:
    - learning and development opportunities and training
    - membership of a professional body
    - professional communities
    - mentor programmes
    - resources, including industry journals

- Principles of knowledge sharing and a learning organisation, including lessons learned, self-development and continuous improvement

- Principles of the circular economy, circular economy hierarchy and carbon reduction strategies

- Net zero considerations/factors:
    - policy
    - financing
    - multi-stakeholder needs
    - data reporting

- Typical company/client net zero strategies and strategic objectives

- Typical reporting requirements in net zero projects (or comparable projects):
    - typical initiatives related to net zero, such as setting, tracking and reporting against carbon emissions as a project metric
    - to meet the needs of multi-stakeholders on the same project
    - typical net zero metrics

- Types of net zero stakeholder and their impact
    - stakeholders to include Government and investment companies
    - impacts include:
        - high likelihood of project change (awareness of change in relation to government policy directly impacting financial baseline)
        - order of deliverables, and how permit requirements for net zero projects can be onerous and drive the critical path.

Unit APC02: Communicating to advise and influence project decisions

Unit aim

On completing this unit, candidates will have demonstrated that they can build and manage a co-operative network of project controls stakeholders, interact and communicate with them to gather information required for project controls and assume the role of trusted expert advisor in making impartial, objective, evidence-based recommendations to influence and inform project decision-making.

Learning outcomes		Assessment criteria	
LO2.1	Build a co-operative network of stakeholders to support delivery of project controls outcomes	S2.1.1	Identify and categorise relevant stakeholders
		S2.1.2	Analyse and interpret the needs and expectations of relevant stakeholders and stakeholder groups
LO2.2	Collaborate and interact with stakeholders in order to deliver project controls outcomes and build co-operative relationships, including adapting stakeholder interaction in different and evolving circumstances	S2.2.1	Modify communication style and method to meet the needs of different stakeholders and for different purposes and evaluate the impact of these actions, including to: • inform, advise and influence • overcome barriers • undertake persuasive actions • respond to feedback and challenging questions
		S2.2.2	Present, articulate and justify project controls-related information, outcomes and recommendations clearly, impartially, objectively, and logically in a professional, persuasive, and engaging manner with integrity, assertiveness, and confidence and by reference to evidence
		S2.2.3	Obtain appropriate information from stakeholders to meet project controls requirements, including clarifying and verifying requirements where information is insufficient or clarity is needed
		S2.2.4	Select and apply data visualisation techniques and devise accompanying data commentaries

	to meet the needs of the intended audience

Underpinning knowledge

Underpinning knowledge is not directly assessed; however, candidates will require the following underpinning knowledge to be able to successfully achieve the above learning outcomes:

- Stakeholder management and stakeholder engagement
    - Stakeholder analysis tools and techniques
    - Levels of stakeholder influence
    - Stakeholder engagement strategies

- Communication theory and practice, including listening techniques
    - benefits of proactive, timely and respectful communication
    - barriers to communication and how to adapt communication for intended recipients
    - forms of questioning and types of questions to ask stakeholders

- Professional ethics, codes of conduct and duty of care, including procedures for professional malpractice and sources of advice for issues of professional ethics and values

- Equality, diversity and inclusion
    - typical organisational policies and procedures
    - implications and benefits for project controls and stakeholder management

- Organisational culture and the benefits of a mature, progressive culture, including:
    - values of transparency, honesty, integrity and trust
    - incentivising early disclosures for bad news
    - principles of a learning organisation
    - integrated thinking and interdisciplinary relationship building

- Principles of confidentiality

- Techniques of narrative storytelling applied to project controls, particularly for constructing commentary of data analysis, and ways of delivering unwanted or bad news; and communicating to inform, persuade and gather information.

- Fundamental principles for ethical behaviour and decision-making:
    - Honesty and integrity
    - Respect for life, law, the environment and public good
    - Accuracy and rigour
    - Leadership and communication

- Human factors, optimism bias and implications for project controls.

Unit APC03: Controlling uncertainties with project risk and assumption management

Unit aim

On completing this unit, candidates will have demonstrated that they can lead a review of risks and assumptions; identify, describe, analyse and evaluate the potential risks in a project controls context and their associated assumptions; and recommend responses, including project controls-related mitigation and control measures.

Learning outcomes		Assessment criteria	
LO3.1	Identify, analyse and evaluate relevant risks and assumptions to determine the potential impact on project control-related activities	S3.1.1	Select and use risk management techniques and tools, including quantitative and qualitative analysis, to identify, describe, assess and evaluate project controls-related risks and assumptions, determine their level of impact and prioritise them
		S3.1.2	Describe the factors to consider when undertaking analysis and reviewing risks and assumptions
		S3.1.3	Justify decisions based on objective interpretation and prioritisation of the internal and external factors that influence the project controls-related risks and assumptions
LO3.2	Recommend project controls-related mitigation and control measures to ensure relevant risks and assumptions are built into project controls activities	S3.2.1	Plan and recommend proportionate project controls-related mitigation and control measures for managing risk and assumptions

Underpinning knowledge

Underpinning knowledge is not directly assessed; however, candidates will require the following underpinning knowledge to be able to successfully achieve the above learning outcomes:

- Risk, the nature of risk and types and sources of project risks and assumptions, including the effects of uncertainty on project controls objectives and outcomes
- Concepts, methods, techniques and tools of risk management for risk identification, risk analysis, risk evaluation and formulating risk responses, including mitigation and control measures
    - how to use them
    - which to use when
- Contingency management and its relationship with risk and assumption management
- Concepts of risk narrative, risk profile and risk appetite
- Assurance techniques including:

- benchmarking good practice and applying norms
- risk analysis
- review of assumptions and contingency plans

- Management reporting and techniques for communicating risk and assumption information to stakeholders.

Unit APC04: Defining requirements and preparing a project controls plan

Unit aim

On completing this unit, candidates will have demonstrated that they can recommend project controls requirements and prepare a project controls plan to meet the requirements of a project specification.

Learning outcomes		Assessment criteria	
LO4.1	Prepare a project controls plan that meets the requirements of a project specification	S4.1.1	Produce a project controls plan that meets the requirements of a project specification
		S4.1.2	Justify a project controls plan in terms of how its content meets project requirements and fits the context
		S4.1.3	Recommend and justify the most suitable project controls approach for the project approach
		S4.1.4	Recommend ways to incorporate contractual deliverables and requirements into project control plans
LO4.2	Recommend project controls requirements to meet the needs of the project	S4.2.1	Identify the appropriate technical information and health, safety and environmental (HSE) requirements to meet requirements for project controls delivery, including norms, assumptions, risks and the right elements to track, by: • obtaining information from stakeholders • interpreting scopes of work, contracts, engineering drawings, previous projects data and HSE information
		S4.2.2	Recommend relevant governance activities to incorporate into a plan to exercise oversight at the required scale
		S4.2.3	Recommend and justify the requirements to track progress and generate meaningful reporting controls data that meet the requirements of the project
		S4.2.4	Recommend the arrangements, procedures, processes and systems to be established prior to project start and justify them compared to

		alternative options, including comparing the practicalities of developing systems and reporting processes
	S4.2.5	Specify project information required for the set-up of data information systems (IT) to meet the needs of project execution
	S4.2.6	Specify the project controls requirements for procedures to identify records and data that will be required for retention, how these are to be secured, the timing of retention and access to these records for quality assurance or to support dispute resolution
	S4.2.7	Identify relevant stakeholders and develop a reporting framework to meet their reporting requirements

Underpinning knowledge

Underpinning knowledge is not directly assessed; however, candidates will require the following underpinning knowledge to be able to successfully achieve the above learning outcomes:

- Principles and purpose of project controls, including procedures and methods, its role in the governance of a project, programme, and portfolio, and strategic perspective of project controls and top management's expectations of the function

- Principles and relevant aspects of governance applied to project controls for proper oversight of projects, including:
    - quality management
    - change control
    - data management and security
    - configuration management
    - document control and version control.

- Project set-up principles, including arrangements, procedures, processes and systems to be established prior to project start

- Processes, procedures, systems and tools used for project controls throughout a project lifecycle

- Internal and external factors that may influence project controls strategy and execution, including:
    - organisational strategic objectives, organisational culture and structures
    - legislative and regulatory requirements
    - industry factors
    - supply chain factors
    - commercial and contractual requirements

- Types of project approaches, including hybrid approaches, principles of the project lifecycle

and typical requirements and deliverables for each phase

- Project controls process and project plan:
    - how to develop one
    - what it should contain

- Purpose, requirements, and content of reporting frameworks, including how they underpin generation of meaningful controls data

- Environmental, Social and Governance (ESG) requirements and their application to the industry, including:
    - Health, safety and environmental (HSE) management
    - Ethics and the application of ethical principles
    - Duty of care
    - Sustainability
    - Legislation, regulations, standards and guidance, how to ensure compliance, and the implications of not meeting these requirements

- Scope of work
    - how to develop one
    - what it should contain
    - project controls requirements

- Typical project controls content of construction and manufacturing execution plans and sequences, their related documents, and the implications for management of execution

- Reporting lines, procedures, systems and documentation, roles and responsibilities, their importance, and consequences of failing to follow them

- Typical project stakeholders and how the role of project controls fits within different management structures, including:
    - roles and responsibilities of project, programme and portfolio management, project team and project steering group/board and other interested business functions, and their expectations and perspectives on project controls, including:
        - Project Management Office (PMO) function and different types of PMO structure:
            - typical conditions for when a PMO is required
            - different types of PMO structure (supportive, controlling and directive) and the degree of control and influence of the PMO on projects in each type
            - PMO relationship with Project Controls and typical requirements and expectations for interactions with the Project Controls function in each structure type.

Unit APC05: Managing commercial and contractual arrangements

Unit aim

On completing this unit, candidates will have demonstrated that they can contribute from a Project Controls perspective to contract management, bids, tenders, procurement, claim management, dispute resolution and other commercial aspects.

Learning outcomes		Assessment criteria	
LO5.1	Prepare project controls content for use in contracts, bid and tender management and procurement	S5.1.1	Specify and produce project controls information to include in bid and tender management and procurement documents
		S5.1.2	Review the level of controls to ensure that they are commensurate with the commercial or contract strategy
LO5.2	Critique bid, tender, contractual and procurement information from a project controls perspective, and make recommendations	S5.2.1	Appraise invitations to tender received or bid responses in terms of project controls-related information (cost, schedule, risk and estimating) and make recommendations
		S5.2.2	Recommend project controls-related requirements to include as contractual obligations in commercial contracts and sub-contracts
LO5.3	Support claim management and dispute resolution from a project controls perspective (including change management)	S5.3.1	Analyse and interpret project controls-related project records: • compare with contractual obligations • determine how far it meets contractual obligations • build a record of facts • use as evidence to a standard that can (or could) be used in claim management and dispute resolutions
		S5.3.2	Adhere to processes to create, record and store project controls information in support of legal and contractual requirements

Underpinning knowledge

Underpinning knowledge is not directly assessed; however, candidates will require the following underpinning knowledge to be able to successfully achieve the above learning outcomes:

- Types of contractual agreements, client/contractor arrangements and commercial proposals, including contract/sub-contract relationships.

- Contract management
  - principles and processes for preparing and managing contracts from pre-award to completion
  - project controls requirements to be included within scope (types of terms and conditions, contract clauses, their reasons for inclusion and how they impact and are influenced by project controls requirements)
  - commercial aspects of contracts and how to integrate project controls activities and requirements
  - typical procedures and practices for review and approval of commercial contracts
  - relevant statutory requirements
  - legal requirements for records: which records to retain, where, for how long and in what format
  - requirements for auditable recording, sharing and storing of information
  - meeting confidentiality requirements
  - monitoring contractors for performance and progress.

- Tender management (bidding and sourcing/procurement)
  - key principles of invitations to tender received and bid responses
  - commercial aspects of contract offers
  - project controls information required for inclusion in a bid process
  - procurement process for goods and services
  - procurement and contracting activities related to project controls
  - the relationship between client/organisational objectives, supply chain objectives and the procurement strategy
  - recordkeeping requirements.

- Supplier selection process
  - roles and responsibilities
  - how to develop suitable selection criteria and apply them for evaluation and ranking of suppliers
  - ethical and confidentiality obligations.

- Claim management and dispute resolution
  - analysis of contracts: rights and obligations, clauses and interpretations
  - compliance with project claim management procedures
  - project information to capture and retrieve for record of facts
  - analysis and interpretation of project records to build a record of facts, capture and retrieval of evidence for claim cases
  - claim strategy requirements
  - claim documentation and presentation
  - sources of information
  - sources of specialist advice
  - requirements of a claim presentation strategy
  - obtaining information on similar claims
  - techniques for analysing opposing claims and structuring reasoned responses, what records to maintain, how they should be held securely to be able to be analysed forensically as and when required.

- Commercial considerations and processes and application in the context of project controls, including:

- commercial control procedures and the impact on them of liabilities and obligations from legislative and regulatory requirements
- legal sources available for commercial advice
- requirements for confidentiality of information.

Unit APC06: Applying data-centric execution and analytics

Unit aim

On completing this unit, candidates will have demonstrated that they can recommend improvements to data systems, data flows and the uses of data for the benefit of project control, including improvements to breakdown structures and coding structures.

Learning outcomes		Assessment criteria	
LO6.1	Critique a data system used within a project control environment and recommend how it may be improved to achieve better control-related outcomes	S6.1.1	Evaluate existing data systems used within a project control environment, including the application of data analytics, and recommend how they may be improved to achieve better outcomes for project controls and project controls data consumers and their data requirements
		S6.1.2	Critique data models and data flows and recommend how they may be improved to achieve better project control outcomes
LO6.2	Critique breakdown structures and coding structures and recommend how they may be improved to achieve better control-related outcomes	S6.2.1	Explain how coding structures underpin data flows and data centric execution and how they can be modified to improve project controls delivery
		S6.2.2	Analyse and evaluate breakdown and coding structures and recommend improvements

Underpinning knowledge

Underpinning knowledge is not directly assessed; however, candidates will require the following underpinning knowledge to be able to successfully achieve the above learning outcomes:

- Data analytics techniques
    a. benefits to project controls
    b. which to use and when

- Data-centric execution architecture, models and integrated processes
    a. advantages and disadvantages, compared to document-driven execution:
        i. single source of truth (SSOT) providing accurate and up-to-date data
        ii. usable formats for all end users
    b. how to configure and integrate for the benefit of project controls
    c. requirements

- Breakdown structures and coding structures
    a. their uses for control, including:
        i. in the creation of data models to aid reporting and insights
        ii. code as a labelling and indexing device
        iii. control accounts
        iv. work packages

        v. breakdown structures as a communication channel
    b. how to interpret, develop, configure and integrate them
    c. structure levels of aggregation and disaggregation and views
    d. information and data required
    e. factors that influence them

- Data flow systems
    a. who handles the data?
    b. where the data are stored
    c. what is done to the data?

- Typical project controls data consumers and their data requirements

- Digital engineering environments, including Building Information Modelling (BIM) and digital assets (engineering information assets)
    a. advantages and disadvantages
    b. how they can be applied to the benefit of project control delivery
    c. requirements, including attributes and relationships of assets, technical data, status information/data maturity, relationships/context

- Big data and machine learning
    a. advantages and disadvantages
    b. sources of information
    c. how it can be applied to the benefit of project control delivery.

Unit APC07: Applying optimisation and performance improvement

Unit aim

On completing this unit, candidates will have demonstrated that they can identify areas for improvement from a project controls perspective and plan and carry out optimisation and performance improvement by applying relevant methods and techniques and making suitable recommendations.

Learning outcomes	Assessment criteria
LO7.1 Plan and carry out optimisation and performance improvement	S7.1.1 Select and apply optimisation/performance improvement methods and techniques to identify potential areas for improvement, optimisation, and efficiencies. This could include: • cost or time minimisation and optimisation of production and construction • improved accuracy of estimates • resource efficiency • project recovery • reduced environmental impact.
	S7.1.2 Produce a report based on an optimisation/performance improvement carried out, outlining evidence-based recommendations and their impact.

Underpinning knowledge

Underpinning knowledge is not directly assessed; however, candidates will require the following underpinning knowledge to be able to successfully achieve the above learning outcomes:

- Modelling techniques (what-if scenarios and impact analysis) used to optimise the potential for improved efficiency against time, cost and quality and for project recovery

- Concepts, methodologies and techniques to use for optimisation and efficiency
  - process improvement cycle
  - root cause analysis
  - requirements management
  - functional analysis
  - impact analysis
  - work study, method study and work measurement
  - time study and methods engineering
  - line balancing
  - value analysis, value engineering, including design for manufacture, assembly and construction, circular economy and whole life costing
  - target costing and target scheduling
  - lean methodology

- Principles of the circular economy, environmental sustainability and minimising impact, including economic use of raw material and methods for minimising waste
- Typical requirements for project phases, including for project close out, transition and handover to operations
- Process improvement or cost improvement workshops
- Sector-specific principles and practice, such as engineering design principles
- Key features of associated delivery technologies, processes and facilities within your industry or specific to your sector
- Typical conditions or factors which create inefficiencies or non-value-added costs within your industry, or specific to your sector.

Unit APC08: Applying change control processes and management

Unit aim

Completing this unit, candidates will have demonstrated that they can apply change control in a project controls context to avoid the disruptive effects of change; and also implement approved planned changes in a controlled and coordinated manner.

Learning outcomes		Assessment criteria	
LO8.1	Apply change control processes to support project control delivery, taking into account the appropriate commercial arrangements, and justify actions taken	S8.1.1	Identify, document, and prioritise changes according to requirements
		S8.1.2	Evaluate the potential impact of a change, including the impact on: • project time, cost, resource • approved project baselines • project, programme and portfolio dependencies • risks and assumptions • defined scope of work • contractual agreements
		S8.1.3	Recommend actions for managing or implementing a change and justify decisions
LO8.2	Implement planned and unplanned project controls-related changes to meet project and organisational requirements in a controlled and coordinated manner appropriate to the change scale	S8.2.1	Implement change control management to manage an approved change or unplanned change in line with existing procedures and processes

Underpinning knowledge

Underpinning knowledge is not directly assessed; however, candidates will require the following underpinning knowledge to be able to successfully achieve the above learning outcomes:

- Types and classes of change (internal and external) and actions for managing them

- Change control process
    - benefits of change control and consequential effects of unrestrained changes
    - impact factors to consider when evaluating or implementing a change
    - stages, process and requirements for each, including for authorisation
    - communication and reporting requirements
    - contractual requirements, including record-keeping (including for owner/contractor organisations)
    - project close out and information gathering for learning from experience

- Techniques for using the baseline and forecasts for analysis, assessment and evaluation of changes and their impact

- Approaches to minimising negative impact of changes (including minimising disruption and associated costs)

- Change control management (implemented for time, cost, resource and risk)
    a. revision control
    b. coding, recording and storing adjustments
    c. reporting
    d. factors, including organisational policy and contractual arrangements
    e. application of project control practices to meet the needs of the process, via detailed work instructions.

Unit APC09: Monitoring and controlling progress and performance

Unit aim

On completing this unit, candidates will have demonstrated that they can track, monitor, measure and influence the progress and performance of project elements.

Learning outcomes		Assessment criteria	
LO9.1	Track and monitor the progress and performance of project elements	S9.1.1	Specify and collect the information and data to track for progress and performance measurement to meet the requirements of a project, including: • to provide different levels of detail in line with work breakdown structure view and coding • to validate the quality of data.
		S9.1.2	Identify and recommend data manipulation and assurance required to underpin the integrity of analysis. This could include: • data cleansing • data transformation • data aggregation.
		S9.1.3	Select and apply cost control techniques to capture actual commitment and expenditure data with appropriate use of accruals
LO9.2	Analyse data to uncover patterns and trends, including making comparisons between planned and actual progress and performance	S9.2.1	Use data analysis techniques to determine actual progress and performance
LO9.3	Interpret and evaluate patterns and trends in datasets to provide insights into progress and performance	S9.3.1	Assess the causes and potential impacts of variances from the baseline
LO9.4	Make recommendations, as appropriate, for maintaining progress and performance or for project recovery	S9.4.1	Recommend project controls-related actions to maintain progress and performance or for project recovery, and describe the impacts of these

Underpinning knowledge

Underpinning knowledge is not directly assessed; however, candidates will require the following underpinning knowledge to be able to successfully achieve the above learning outcomes:

- Importance of timely and accurate progress reports, including for early warning signals and for reporting requirements
- Information and data that can be used to track and monitor progress and performance to meet requirements of the project, organisation and other stakeholders

- types, typical sources and flow paths
- how to collect, gather and use them
- which to use when
- verification of data

- Techniques of data collection, data analysis, data interpretation, data manipulation and data aggregation
  - how to use them
  - which to use when

- Techniques for tracking, monitoring, measuring and reporting progress and performance (including earned value analysis)
  - how to use them
  - which to use when

- Fundamentals of statistical analysis (including productivity and performance analysis)
  - Typically includes:
    - Terminology used to reflect time-based differences (e.g. base year, current year)
    - Normalisation of data, especially time-based data
    - The interpretation of published indices from governmental or commercial sources
    - Averages and standard deviations
    - Escalation and indexation
    - Investment appraisal
    - Learning curve analysis.
  - how to use them
  - which to use when

- Techniques for modelling possible future outcomes of change, adjustments, trends, deviations and departures, and for modelling predicted outcomes of proposed interventions for project recovery (what-if scenarios)

- Data assurance techniques for appraising accuracy of information
  a. benchmarking good practice
  b. review of assumptions
  c. data profiling to discover inconsistencies and other anomalies
  d. data cleansing activities to improve data quality (e.g. removing outliers, missing data interpolation)
  e. applying norms.

Unit APC10: Forecasting to influence future conditions

Unit aim

On completing this unit, candidates will have demonstrated that they can increase the predictability of future project performance through application of forecasting and predictive analysis to project data, including for producing forecasts for different scenarios and recommending courses of action based on these.

Learning outcomes		Assessment criteria	
LO10.1	Forecast future project conditions and make recommendations	S10.1.1	Specify and collect the information and data to capture and trend for forecasting of different variables to meet requirements of the project
		S10.1.2	Select and use forecasting techniques to extrapolate trends and figures in historical data (past and present) to predict future project outturns
		S10.1.3	Produce schedule and/or cost reforecasts to reforecast or change resource patterns and logic and calculate phasing of future expenditure and income, and for cost at completion, taking into account risk and change
		S10.1.4	Apply statistical analysis to historical data and predicted trends and values and interpret forecasted results
		S10.1.5	Produce calculations and reports which reflect future project conditions for time, resource and cost (income and expenditure)
LO10.2	Produce what-if forecasts for different scenarios and recommend courses of action based on these	S10.2.1	Model what-if forecasts and evaluate the future conditions predicted for different scenarios
LO10.3	Prepare forecasting data and information for stakeholder communication	S10.3.1	Create a report using data manipulation, aggregation and visualisation techniques to make forecasting data meaningful for the intended stakeholder, including at detailed and summary levels

Underpinning knowledge

Underpinning knowledge is not directly assessed; however, candidates will require the following underpinning knowledge to be able to successfully achieve the above learning outcomes:

- Importance of leading and lagging data

- Methods and techniques of forecasting and predictive analysis, including:
  - fundamentals of statistical analysis, which typically includes:

    - Terminology used to reflect time-based differences (e.g. base year, current year)
    - Normalisation of data, especially time-based data
    - The interpretation of published indices from governmental or commercial sources
    - Averages and standard deviations
    - Escalation and indexation
    - Investment appraisal
    - Learning curve analysis.
  - how to use them
  - which to use when

- Factors and considerations for forecasting, including:
  - balancing expert human input and statistical-based input
  - relationship between risk, forecasting, change and contingency management.

Unit APC11: Applying estimating practice to meet requirements

Unit aim

On completing this unit, candidates will have demonstrated that they can develop and review estimates, determine their accuracy, provide confidence in estimating information, undertake estimating assurance, and will have demonstrated insight into the other project control functions and how estimating should interact to meet requirements.

Learning outcomes		Assessment criteria	
LO11.1	Develop estimates (time and cost) that meet the requirements of the project	S11.1.1	Select and use estimating techniques to develop time and cost estimates that meet the requirements of the project
LO11.2	Determine the accuracy of estimates (time and cost) and estimating information by using estimating assurance techniques	S11.2.1	Use estimating assurance techniques to determine the accuracy of time and cost estimating information a estimating information includes: • estimates • estimate frameworks b estimate narrative/basis of estimates c assurance techniques include: • benchmarking • cost and schedule risk analysis
LO11.3	Provide confidence in estimating information and related recommendations by providing and justifying associated estimating narratives and frameworks	S11.3.1	Justify that estimating information meets the requirements of the project, including: a selection of estimating technique b estimating narrative e.g. through basis of estimate reports c estimating framework d estimate assurance used
LO11.4	Demonstrate insight into the other project control functions and how estimating should interact to meet requirements	S11.4.1	Explain the principles of developing a plan and schedule
		S11.4.2	Explain the principles of developing a budget and cost baseline
		S11.4.3	Explain the interrelationship between the estimating function and the other project control functions, including how to interact and meet each other's expectations and the actions that need to be taken from each perspective to meet requirements of a project

Underpinning knowledge

Underpinning knowledge is not directly assessed; however, candidates will require the following underpinning knowledge to be able to successfully achieve the above learning outcomes:

- Estimating techniques, methods and classes
    a. advantages and disadvantages
    b. how to use them
    c. which to use when.

- Estimate narrative/basis of estimate (time and cost):
    a. advantages and disadvantages
    b. how to develop one
    c. what it should contain.

- Estimating frameworks:
    a. advantages and disadvantages
    b. how to develop one
    c. what it should contain.

- How to apply estimate assurance techniques including:
    a. benchmarking good practice
    b. quantitative risk analysis (time and cost)
    c. review of assumptions, contingencies etc.

- External and internal factors and constraints that impact on the estimate, especially those relevant to the context of the estimate (e.g. sector/technology etc)

- The application and limitations of technology, programs and software applications used for estimating

Unit APC12: Applying planning and scheduling practice to meet requirements

Unit aim

On completing this unit, candidates will have demonstrated that they can develop and review plans and schedules, provide confidence in scheduling information, and will have demonstrated insight into the other project control functions and how planning/scheduling should interact to meet requirements.

Learning outcomes		Assessment criteria	
LO12.1	Develop a project plan that meets requirements of the project	S12.1.1	Develop a planning and scheduling strategy that meets the requirements of the project and justify it
		S12.1.2	Select and use planning approaches to develop project plans that deliver scopes of work and meet requirements of the project
		S12.1.3	Interpret scopes of work to compose work breakdown structures and project plans that meet requirements of the project
LO12.2	Develop a schedule that reflects the project plan by integrating required events, activities and resources with credible logic flow, sequences and durations	S12.2.1	Select and use schedule development techniques to develop schedules that support delivery of project plans and meet requirements, including: • derive work activities from a scope of work • develop activity logic plans • capture true scope, requirements and objectives • outline resource availability, dependencies, structures and interfaces • are risk-adjusted, in line with project, business and/or contractual risk profile and risk appetite.
		S12.2.2	Integrate schedule-related project-specific commercial requirements into schedules
LO12.3	Provide confidence in scheduling information and related recommendations using scheduling assurance techniques and scheduling narratives	S12.3.1	Determine the accuracy of scheduling information by using schedule assurance techniques
		S12.3.2	Justify that scheduling information meets the requirements and scope of the project
LO12.4	Demonstrate insight into the other project control functions	S12.4.1	Explain the principles of developing a time and cost estimate

and how planning and scheduling should interact to meet requirements	S12.4.2	Explain the principles of developing a budget and cost baseline
	S12.4.3	Explain the interrelationship between the different project control functions, including how they should interact to meet each other's expectations and the actions that need to be taken from each perspective to meet requirements of a project

Underpinning knowledge

Underpinning knowledge is not directly assessed; however, candidates will require the following underpinning knowledge to be able to successfully achieve the above learning outcomes:

- Planning and scheduling strategy
  - how to develop one
  - what it should contain

- Planning approaches
  - such as top-down, bottom-up, rolling wave, agile
  - advantages and disadvantages of each
  - how to use them
  - which to use when

- Planning logic of activities and gaining input and validation from stakeholders to:
  - clarify project scope
  - incorporate project objectives
  - determine resource availability
  - identify dependencies
  - develop project structures
  - identify interfaces
  - risk-adjust plans.

- Schedule development tools and techniques
  - how to use them
  - which to use when

- Schedule narrative/basis of schedule
  - how to develop one
  - what it should contain

- How to apply schedule assurance techniques, including:
  - schedule integrity analysis
  - benchmarking good practice
  - schedule risk analysis
  - schedule quality check
  - review of assumptions, contingencies etc.

- Types of schedule-related project-specific commercial requirements

- External and internal factors, including constraints, that impact on plans and schedules, especially those relevant to the context of the schedule

- Schedule information required for an optimisation exercise

Unit APC13: Applying cost engineering practice to set budgets and cost baselines

Unit aim

On completing this unit, candidates will have demonstrated that they can set fully costed budget baselines to control against, develop contingency budgets and associated drawdown plans, and will have demonstrated insight into the other project control functions and how cost engineering should interact to meet requirements.

Learning outcomes		Assessment criteria	
LO13.1	Set a budget and cost baseline that meet the requirements of an agreed project scope	S13.1.1	Amend an estimate to take into account final agreements in project scope
		S13.1.2	Establish a fully costed budget aligned to all final agreements in project scope by combining final cost estimates, project schedules and work breakdown structures
		S13.1.3	Select and use cost control techniques to break down an estimate into a cost model that can used as a cost baseline to be controlled against
		S13.1.4	Set a target or reallocate an element of a budget to take into account new risks identified after scope has been agreed
		S13.1.5	Select and apply the appropriate level of cost control for a selected cost breakdown structure
		S13.1.6	Develop a cash flow projection and assessment of value of work done over time by integrating cost and schedule data
LO13.2	Develop a risk and contingency budget and drawdown plan	S13.2.1	Select and use risk modelling techniques to devise a risk and contingency budget; and drawdown plan, based on the required contingencies for a final awarded piece of work
LO13.3	Provide confidence in budget and cost baseline information and related recommendations	S13.3.1	Determine the accuracy of budget and cost baseline information
		S13.3.2	Justify that budget and cost baseline information meets the requirements of an agreed project scope and other considerations, where appropriate
LO13.4	Demonstrate insight into the other project control functions and how	S13.4.1	Explain the principles of developing a time and cost estimate

cost engineering should interact to meet requirements	S13.4.2	Explain the principles of developing a project plan and schedule
	S13.4.3	Explain the interrelationship between the different project control functions, including how they should interact to meet each other's expectations and the actions that need to be taken from each perspective to meet requirements of a project

Underpinning knowledge

Underpinning knowledge is not directly assessed; however, candidates will require the following underpinning knowledge to be able to successfully achieve the above learning outcomes:

- Methods, techniques and processes for developing budgets and cost baselines to meet the requirements of different stakeholders
  - how to use them
  - which to use when
  - types of budgets and baselines, including initial budgets and baselines
  - information required and its sources, such as basis of estimate
  - factors that influence the accuracy of total estimates and budgets, specifically time, cost and quality relationships, and class of estimate

- Cost control methods, techniques and levels; and relevant financial control and adjustment processes
  - advantages and disadvantages
  - how to use them
  - which to use when

- Approaches to creating budgets and cost baselines, including:
  - Cost control hierarchy
  - Budget transfers and other budget variances
  - Monitoring supplier and contractor commitments
  - Expenditures
  - Monitoring of cost trends and assessments of forecast to complete

- Financial controls as relevant to project controls, including taxation, cashflow, accruals, payment terms

- Project cash flows and cost profiles
  - How to establish them using initial budgets and baselines
  - Requirements, including application of discounting, economic modelling and assumptions
  - How to optimise them
  - Preparation for cash flow review protocol

- Contingency budgets and drawdown plans
  - How to develop them
  - Influencing factors, including applying Quantitative Risk Analysis (QRA)

- Management reporting set-up and visualisation techniques for communicating and

presenting budget and baseline information and data, including:

- projections (including proposed budgets) and forecasts
- cost profile requirements
- to gain authorisation for use.

Unit APC14: Applying integrated project controls practice

Unit aim

On completing this unit, candidates will have demonstrated that they can develop estimates, project plans, schedules, budgets and cost baselines; and that they understand the interrelationship between the project control functions and how they should interact.

Learning outcomes		Assessment criteria	
LO14.1	Develop a time and cost estimate that meets requirements of a project	S14.1.1	Select and use estimating techniques to develop time and cost estimates that meet the requirements of the project
LO14.2	Develop a project plan and schedule that meet requirements of a project	S14.2.1	Select and use planning approaches to develop project plans that deliver scopes of work and meet requirements of the project
		S14.2.2	Select and use schedule development techniques to develop schedules that support delivery of project plans and meet requirements, including: • derive work activities from a scope of work • develop activity logic plans • capture true scope, requirements and objectives • outline resource availability, dependencies, structures and interfaces • are risk-adjusted, in line with project, business and/or contractual risk profile and risk appetite.
LO14.3	Establish a budget and cost baseline that meets requirements of a project	S14.3.1	Establish a fully costed budget aligned to all final agreements in project scope by combining final cost estimates, project schedules and work breakdown structures
		S14.3.2	Select and use cost control techniques to break down an estimate into a cost model that can used as a cost baseline to be controlled against
LO14.4	Provide confidence in project controls information by using assurance techniques and justifying associated narrative	S14.4.1	Determine the accuracy of project controls information
		S14.4.2	Justify that project controls information meets the requirements of a project

LO14.5	Demonstrate insight into the project control functions and how all functions should interact to meet requirements	S14.5.1	Explain the interrelationship between the project control functions, including how they should interact to meet each other's expectations and the actions that need to be taken from each perspective to meet requirements of a project

Underpinning knowledge

Underpinning knowledge is not directly assessed; however, candidates will require the following underpinning knowledge to be able to successfully achieve the above learning outcomes:

- Principles of estimating
- Principles of planning and scheduling
- Principles of developing a budget and cost baseline
- Assurance methods and techniques