

Qualification Specification

The Advanced Analytics Solutions Level 5 Improvement Specialist Qualification

Qualification number: 610/2357/7

Qualification Summary

Qualification Title	Advanced Analytics Solutions Level 5 Improvement Specialist Qualification
Ofqual qualification number (QN)	610/2357/7
Guided Learning Hours (GLH)	240
Total Qualification Time (TQT)	520
Minimum Age	19
Qualification Purpose Summary	<p>This qualification is designed for learners who wish lead the deployment of an improvement strategy, who wish to train others in improvement techniques and provide broad and deep technical expertise in advanced and complex Lean and Six Sigma, Project and Change Management principles and tools to enable identification and delivery of improvement opportunities aligned to key business goals.</p> <p>The qualification will develop the learner's skills at leading large scale, cross business, projects where they need to work closely with other Improvement Specialists to support the delivery of improvement strategy, work on multiple simultaneous projects linked to key business objectives and identify and engage subject matter experts and key stakeholders.</p>
Grading	Fail/Pass/Merit/Distinction
Assessment Methods	Multiple Choice Exam, Professional Discussion
Work/Industry placement experience	<p>Learners must produce a portfolio of evidence which must include a range of documents, such as reports from process improvement projects, graphs showing process analysis, charts showing impact readiness, images of House of Quality and extracts from project plans.</p> <p>It is likely therefore that the learner will either have a full or part time work role or will have a significant work placement.</p>

Change Control

This section summarises the changes made to this qualification specification.

Version	Publication Date	Summary of Changes
1.0	June 2023	First publication

SECTION ONE - INTRODUCTION

Introduction

If you are using this qualification specification for the purposes of planning training delivery, please ensure that you use the most up to date version.

In the event of a conflict between this document and the assessment plan published by the Institute for Apprenticeships and Technical Education then the latter takes precedence.

Aims and Objectives

This qualification prepares learners to lead teams to lead the deployment of improvement strategy, to train others and to provide broad and deep technical expertise in advanced and complex Lean and Six Sigma, Project and Change Management principles and tools to enable identification and delivery of improvement opportunities aligned to key business goals.

Improvement Specialists manage (directly and/or matrix) Improvement Practitioners who lead smaller improvement projects aligned to the improvement strategy. Improvement Specialists draw on their advanced knowledge and skills in applying Improvement principles and tools across a range of programmes/ projects/areas to build the capability of others. They also swiftly visualise processes, problems and opportunities and use both graphical and statistical analysis to deliver improvements.

They work closely with other Improvement Specialists to support the delivery of improvement strategy, working on multiple simultaneous projects linked to key business objectives, identifying, and engaging both subject matter experts and key stakeholders. Their work generally requires them to interact with others but typically involves a high degree of autonomy.

The objectives of this qualification are to develop skills in:

- Leading the local deployment of improvement strategy and supporting delivery of business goals
- Providing technical expertise in structured Improvement methods and advanced tools such as Multiple Regression and Designed Experiments to analyse relationships between inputs and outputs
- Leading advanced and/or cross-functional Improvement projects such as process re-engineering and change programmes
- Co-ordinating Practitioner-level Improvement training, activities and projects; for example, they may deliver Lean Six Sigma Green Belt training and coaching to an awarding body accreditation standard
- Coaching, mentoring and communicating with Improvement Practitioners, business leaders and stakeholders

Support Handbook

This qualification specification must be used alongside the Guidance Handbook for Employers, Learners, and Training Providers, which is available on request as well as the formal Assessment Plan available from the Institute for Apprenticeships and Technical Education. This handbook contains additional supporting information to help with planning and delivery. This handbook also contains general information on assessment to help learners, employers and training providers plan.

This qualification specification contains all the qualification-specific information you will need that is not contained in the Guidance Handbook.

Guidance for entry and registration

Registration is at the discretion of the Training Provider, in accordance with equality legislation, and Individual employers will set their own entry requirements.

There are no specific prior skills or knowledge a learner must have for this qualification; however, prior certification as a Level 4 Improvement Practitioner or an equivalent Green Belt qualification is typical, and candidates who do not have this will likely need additional support. This is because many of the Level 5 topics build on Level 4 knowledge; in addition, the skills for this Level 5 qualification include coaching Level 4s.

Training Providers are responsible for ensuring that learners are capable of achieving the learning outcomes (LO's) and complying with the relevant literacy, numeracy and health and safety requirements.

Learners registered on this qualification should not undertake another qualification at the same level, or with a similar title, as duplication of learning may affect eligibility for funding.

Achieving this qualification

To be awarded this qualification, learners are required to successfully achieve a pass or better in both mandatory assessment methods.

Refer to the qualification content for further information.

To achieve this qualification, learners must successfully demonstrate their achievement of all of the knowledge, skills and behaviour criteria as detailed in this qualification specification.

Progression

Learners who achieve this qualification could progress to many further learning opportunities, including the following:

- Level 6 Improvement Leader

Resource requirements

There are no mandatory resource requirements for this qualification, but Training Providers must ensure learners have access to suitable resources to enable them to cover all the appropriate learning objectives.

The following are essential resources without which learners will find it difficult to complete the qualification:

- Standard office IT equipment to gather, analyse and present data
- Data analysis software such as Minitab, JMP, SPSS, SigmaXL, Data Analysis Toolkit

How this qualification is assessed

Assessment is a process of measuring a learner's knowledge and skill against the standards set in a qualification.

This qualification is externally assessed and quality assured.

The assessment consists of two components:

- A multiple-choice examination, externally graded
- An externally assessed portfolio of evidence

Learners must achieve at least a pass in both assessments to gain this qualification.

All the evidence generated by the learner will be assessed against the standards expected of a Level 5 Improvement Specialist for each learning objective.

Unless otherwise stated in this specification, all learners taking this qualification must be assessed in English and all evidence presented for external assessment must be in English.

SECTION TWO - CONTENT AND ASSESSMENT GUIDANCE

This section provides details of the structure and content of this qualification.

The types of evidence listed are for guidance purposes only. Other types of evidence are acceptable if all learning outcomes are covered, and if the evidence generated can be externally assessed and quality assured.

The explanation of terms shows how the terms used in the qualification content are applied to this qualification, this is contained in Section Three.

Assessment Method 01 Multiple Choice Examination

Assessment Summary		
<p>This mandatory assessment element consists of a 4 hour long multiple choice examination. The examination consists of eight separate mini case-studies. Each case-study includes a brief description of a scenario and a set of data in Excel, Minitab or an alternative software package. It requires the apprentice to work with the set of data, apply tools and draw conclusions to answer 10 multiple-choice questions per case study.</p>		
<p>To pass this assessment element learners must achieve 75% correct answers (60/80 correct). A merit is awarded for 80% correct and a distinction for 85% or better.</p>		
<p>This is an “open book” examination where learners may refer to training material or reference books including online materials except AI based systems, however, the quantity and complexity of questions mean that apprentices will not have time to consult reference material for every question.</p>		
<p>Each case study will cover a different topic from the following list: Sampling, Measurement System Analysis, Capability Analysis, Transformation, Hypothesis Testing, Correlation/Regression, Statistical Process Control.</p>		
<p>Please refer to the Guidance Handbook for Employers, Learners, and Training Providers for further information regarding the ID verification process and details regarding the set-up of assessments.</p>		
<p>While on-programme, the employer/training provider should brief the apprentice on the areas to be assessed by the multiple-choice examination. In readiness for the end-point assessment, the apprentice should complete a practice examination which are provided on request.</p>		
KSB Ref. Number	Knowledge, Skill or Behaviour criteria	Learning Objectives <i>The learner knows ...</i> <i>The learner can ...</i>
K9	Data Acquisition Planning	<ul style="list-style-type: none"> The purpose and methods of stratifying data The purpose and application of rational sub-grouping The meaning of Power and its effect on sample size requirements
K10	Statistics & Measures	<ul style="list-style-type: none"> Different probability distributions How to test for fit of probability distributions to data

		<ul style="list-style-type: none"> • The purpose of confidence intervals • The central limit theorem • How to test data for stability and normality • Strategies for dealing with non-stable and non-normal data
S12	Statistics & Measures	<ul style="list-style-type: none"> • Confirm data and fit for a range of distribution models • Establish predictions based on distribution models • Calculate confidence intervals for statistics
K12	Measurement Systems Analysis	<ul style="list-style-type: none"> • Gauge R&R studies including the meaning of repeatability and reproducibility • Attribute Agreement Analysis studies including use and interpretation of Kappa values • The impact of long term measurement error
K13	Process Capability	<ul style="list-style-type: none"> • How to calculate process capability for variable data • The purpose, application and limitations of data transformation • Life data analysis and prediction
S14	Process Capability & Performance	<ul style="list-style-type: none"> • Identify data stability / distribution issues and apply appropriate strategies to enable robust capability analysis • Analyse life data to establish rates and patterns
K14	Root Cause Analysis	<ul style="list-style-type: none"> • The purpose and application of matrix plots • The purpose and application of multi vari charts • The purpose and application of hypothesis testing principles and methods including variable and discrete data with two or more groups • The purpose and application of correlation & regression principles and methods
S15	Root Cause Analysis	<ul style="list-style-type: none"> • Make appropriate use of data to assess the contribution of critical inputs / root cause(s) to product/process performance • Use appropriate graphical and statistical tools to draw and communicate conclusions
S13	Data Analysis - Statistical Methods	<ul style="list-style-type: none"> • Model random behaviour and make inferences with levels of confidence • Calculate/recommend sample size • Test hypotheses for all data types • Assess input/output correlation • Generate , analyse and interpret simple and multiple predictive relationship models

S17	Data Analysis - Statistical Process Control	<ul style="list-style-type: none">• Monitor and assess ongoing process variation and changes through chart selection (both variable and discrete data), control limit setting, sample sizing/frequency and control rules
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Assessment Method 02 Professional Discussion

Assessment Summary	
<p>This mandatory assessment element consists of a learner led professional discussion lasting between 2 hours and 2 hours 20 minutes to include open style questions from the assessor to clarify or follow up evidence.</p> <p>The apprentice will discuss and present the evidence of their training, learning and workshops undertaken. Their portfolio should clearly demonstrate the KSB's required for this assessment element and must have evidence that is valid, authentic, sufficient and current.</p> <p>Details of other arrangements, including employer representative attendance, may be found in the Guidance Handbook.</p> <p>To pass this assessment element learners must achieve all criteria at pass level. To achieve a merit in this assessment all pass criteria and 12 or more merit criteria must be met (of which 2 -3 are behaviours), to achieve a distinction a further 10 or more distinction criteria (or which 1-2 are behaviours).</p> <p>Where a pass, merit or distinction criteria is not shown then it is not available for that KSB element.</p>	
KSB Ref. Number	Learning Objectives <i>The learner ...</i>
K1 & S1 Leading Improvement Teams	<p>To pass, knows:</p> <ul style="list-style-type: none"> • Personality types • Team development stages • Motivational techniques • Situational leadership • Learning styles • Mentoring models <p>To pass, can:</p> <ul style="list-style-type: none"> • Set up and lead an improvement team to deliver strategically aligned business benefits • Follow the steps of a recognised problem solving methodology (eg DMAIC, PPS) • Conduct gateway reviews to assess suitability to proceed • Select and apply published approaches (such as situational leadership and mentoring models) to communicate with and lead an improvement team over the course of an improvement project, engaging with stakeholders throughout <p>For a merit, can:</p>

	<ul style="list-style-type: none"> • Mentor others in setting up and leading effective improvement teams <p>For a distinction, can:</p> <ul style="list-style-type: none"> • Set up or lead new activities that contribute to the selection and application of methods or the processes for conducting gateway assessments to ensure suitability of projects to progress • Promote the principles and benefits of coaching
<p>K3 Project Reviews & Coaching</p>	<p>To pass, knows:</p> <ul style="list-style-type: none"> • Coaching models • Maslow's hierarchy of needs • Impact / readiness • Influencing strategies <p>To pass, can:</p> <ul style="list-style-type: none"> • Apply change management tools to ensure effective and efficient delivery of business benefits through an improvement project • Develop a plan and use a range of strategies to influence others over the course of an improvement project <p>For a merit, can:</p> <ul style="list-style-type: none"> • Guide others in the preparation and/or presentation of proposals and plans <p>For a distinction, can:</p> <ul style="list-style-type: none"> • Promote Improvement principles, methods and tools to others.
<p>K5 Commercial Environment</p>	<p>To pass, knows:</p> <ul style="list-style-type: none"> • Business and economic risks including changes in legislation, government regulation or trading conditions that can impact all aspects of improvement from Project Selection through to selection/implementation of improvements. <p>To pass, can:</p> <ul style="list-style-type: none"> • Identify and prioritise business and economic risk in the context of identifying, managing and implementing improvement projects. <p>For a merit, can:</p>

	<ul style="list-style-type: none"> • Identify new approaches to identifying and prioritising business and economic risk in the context of managing a multi-project improvement programme. <p>For a distinction, can:</p> <ul style="list-style-type: none"> • Consider, and improve awareness across the business, of new risks that may arise in the future (e.g. the impact of Industry 4.0).
<p>K6 Principles & Methods for improvement</p>	<p>To pass, knows:</p> <ul style="list-style-type: none"> • How to apply Improvement Methods across all functions. • Policy deployment principles. • Lean culture. <p>To pass, can:</p> <ul style="list-style-type: none"> • Apply Improvement methodologies to improve processes in at least 2 different parts of the business. <p>For a merit, can:</p> <ul style="list-style-type: none"> • Apply a recognised methodology to design a new process, product or service right first time.
<p>K7 Voice of the Customer</p>	<p>To pass, knows:</p> <ul style="list-style-type: none"> • Interviewing and focus groups. • Quality Function Deployment principles. • How to build a House of Quality. <p>To pass, can:</p> <ul style="list-style-type: none"> • Use a range of methods to understand the voice of customers. <p>For a merit, can:</p> <ul style="list-style-type: none"> • Build a House of Quality to support the design of a new process, product or service. <p>For a distinction, can:</p> <ul style="list-style-type: none"> • Guide others in the application of Voice of Customer principles and tools.
<p>K8 & S9 Process Mapping and Analysis</p>	<p>To pass, knows:</p> <ul style="list-style-type: none"> • Activity network diagrams • Design structure matrix • Process modelling

	<ul style="list-style-type: none"> • Key function diagrams and analysis <p>To pass, can:</p> <ul style="list-style-type: none"> • Use methods to map and analyse processes. • Seek opportunities to guide others in the application of Process Mapping and Analysis principles and tools.
<p>K11 & S10 Lean Concepts and Tools</p>	<p>To pass, knows:</p> <ul style="list-style-type: none"> • Principles of Lean Thinking and Lean Tools including origins and cultural aspects critical to successful application within an organisation. <p>To pass, can:</p> <ul style="list-style-type: none"> • Apply Lean tools to identify to improve processes in at least 2 different parts of the business. • Select and apply methods and tools to identify and analyse a value-stream to optimise flow to customer. • Develop a plan to deploy Lean principles, methods and tools in their area of responsibility. <p>For a merit, can:</p> <ul style="list-style-type: none"> • Guide others in the application of Lean principles and thinking and tools. <p>For a distinction, can:</p> <ul style="list-style-type: none"> • Develop and implement a plan to build a Lean culture in their area of responsibility.

<p>K15 & S16 Experimentation</p>	<p>To pass, knows:</p> <ul style="list-style-type: none"> • Principles of full and fractional designed experiments including replicates, repeats, randomisation, blocking and centre points, resolution and confounding. • Planning and analysis using residuals, main effects & interaction plots, hierarchy of terms, Response Surface Method, Split plots, Analysis of variance (ANOVA). • Approaches for model optimisation. <p>To pass, can:</p> <ul style="list-style-type: none"> • Guide others on the planning, analysis and interpretation of experiments. • Plan, conduct, analyse and optimise both full and fractional experiments. <p>For a merit, can:</p> <ul style="list-style-type: none"> • Select and apply tools to optimise models. <p>For a distinction, can:</p> <ul style="list-style-type: none"> • Promote the principles and benefits of designed experiments to others.
<p>K16 Identification & Prioritisation</p>	<p>For a merit, can:</p> <ul style="list-style-type: none"> • Apply creativity tools to support the identification and prioritisation of improvement opportunities and/or solutions. <p>For a distinction, can:</p> <ul style="list-style-type: none"> • Guide others in the principles and benefits of applying creativity tools.
<p>K17 & S19 Failure Mode Avoidance</p>	<p>To pass, knows:</p> <ul style="list-style-type: none"> • System state flow • Boundary diagram • Interface analysis tables • Fault tree analysis • Robustness checklist • Tolerance design and analysis <p>To pass, can:</p> <ul style="list-style-type: none"> • Decompose complex systems in order to define main functions. Analyse system interactions. Cascade knowledge through fault tree analysis. Create and assess design rules, standards & verification

	<p>methods. Complete robustness studies to select appropriate control strategies and detection methods.</p> <ul style="list-style-type: none"> • Apply Failure Mode Avoidance tools to support the design and implementation of an improved process, product or service in the workplace. <p>For a merit, can:</p> <ul style="list-style-type: none"> • Apply Failure Mode Avoidance tools to support the design and implementation of a <u>new</u> process, product or service in the workplace. <p>For a distinction, can:</p> <ul style="list-style-type: none"> • Guide others in the principles and benefits of applying Failure Mode Avoidance principles and tools.
<p>K18 & S20 Sustainability & Control</p>	<p>To pass, can:</p> <ul style="list-style-type: none"> • Guide others on control and sustainability planning including methods and tools to maintain benefits, extraction of learning, replication, sharing and consolidation of new knowledge into organisational learning.
<p>S2 Strategic Deployment of Continuous Improvement</p>	<p>To pass, can:</p> <ul style="list-style-type: none"> • Contribute to deployment of improvement strategy, participating as an active member of the improvement community within the business. <p>For a merit, can:</p> <ul style="list-style-type: none"> • Participate in the improvement community outside of the business. <p>For a distinction, can:</p> <ul style="list-style-type: none"> • Set-up or lead new activities that contribute to the improvement community outside the business.
<p>S3 Communication</p>	<p>To pass, can:</p> <ul style="list-style-type: none"> • Prepare and present concise proposals and plans. • Capture and share progress through effective formats • Identify and communicate key points concisely.
<p>S4 Capability Development</p>	<p>To pass, can:</p> <ul style="list-style-type: none"> • Deliver a training session meeting the required duration which includes a range of delivery methods to suit different learning styles, delivery and resources that are clear, technically correct, logically

	<p>presented and pitched at the correct level for the audience and checks of learning throughout the session, correcting/reinforcing learning where necessary</p> <ul style="list-style-type: none"> • Provide specific and accurate feedback to others such there is a clear understanding of gaps and next steps required. <p>For a merit, can:</p> <ul style="list-style-type: none"> • Guide others in developing capability. <p>For a distinction, can:</p> <ul style="list-style-type: none"> • Set-up or lead new activities that contribute to the development of capability in others.
<p>S7 Principles and Methods for Improvement</p>	<p>To pass, can:</p> <ul style="list-style-type: none"> • Guide improvement practitioners on the selection of improvement methods (eg. Practical Problem Solving, Define- Measure-Analyse-Improve- Control, 8-Disciplines, Identify-Define-Optimise- Verify) and the selection and application of tools linked together to deliver improvements.
<p>S8 Project Selection & Scope</p>	<p>To pass, can:</p> <ul style="list-style-type: none"> • Identify and prioritise new opportunities in the context of a portfolio of multiple improvement projects. <p>For a merit, can:</p> <ul style="list-style-type: none"> • Identify new approaches to identifying and prioritising improvement opportunities that map to high-level organisation objectives and key value- streams. <p>For a distinction, can:</p> <ul style="list-style-type: none"> • Consider new opportunities that may arise in the future (e.g. the impact of Industry 4.0).
<p>S11 Measurement</p>	<p>To pass, can:</p> <ul style="list-style-type: none"> • Guide others on the planning, analysis and interpretation of data collection and measurement studies including the design of tests to recreate failures and steps to diagnose/reduce short and long-term measurement variation. <p>For a merit, can:</p>

	<ul style="list-style-type: none"> Identify new approaches to improving the repeatability and/or reproducibility of data in the context of an improvement project.
S18 Benchmarking	<p>To pass, can:</p> <ul style="list-style-type: none"> Guide others on benchmarking to support all stages of improvement projects including future- state design. <p>For a merit, can:</p> <ul style="list-style-type: none"> Promote the principles and benefits of benchmarking
B1 Drive for Results	<p>To pass, can:</p> <ul style="list-style-type: none"> Overcome barriers in the pursuit of continuous improvement. <p>For a merit, can:</p> <ul style="list-style-type: none"> Guide others in overcoming barriers to continuous improvement
B2 Team Working	<p>To pass, can:</p> <ul style="list-style-type: none"> Lead cross functional project teams proactively. Regularly support others and replicate learning. <p>For a merit, can:</p> <ul style="list-style-type: none"> Diagnose potential causes for ineffective teams and plan actions to address these.
B3 Professionalism	<p>To pass, can:</p> <ul style="list-style-type: none"> Exemplify high standard of professional integrity, ethics and trust within the organisation, whilst maintaining flexibility to the needs of the business. <p>For a merit, can:</p> <ul style="list-style-type: none"> Drive high standards of professional integrity, ethics and trust within the organisation.
B4 Process Thinking	<p>To pass, can:</p> <ul style="list-style-type: none"> Drive process-thinking and customer-focused, data-driven decision making. <p>For a distinction, can:</p>

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	<ul style="list-style-type: none">• Promote the principles and benefits of process- thinking and customer- focused, data-driven decision making.
B5 Continuous Development	<p>To pass, can:</p> <ul style="list-style-type: none">• Identify and model opportunities for development of self and others. <p>For a distinction, can:</p> <ul style="list-style-type: none">• Set-up or lead new activities that contribute to recognising/identifying gaps in capability and to developing plans to close these gaps.
B6 Safe Working	<p>To pass, can:</p> <ul style="list-style-type: none">• Adopt a proactive approach to safety.• Encourage others and suggest improvements on compliance.

SECTION THREE - EXPLANATION OF TERMS

This table explains how the terms used are applied to this qualification (not all verbs are used in this qualification)

Define	Give the meaning of a word or phrase
Demonstrate	Show an understanding of a subject
Describe	Provide details about the subject or item
Explain	Provide details about the subject with reasons showing how or why
Give examples of ...	Provide relevant examples to support the subject
Identify	List or name the main points
Indicate	Point out or show using words, illustrations or diagrams
Locate	Find or identify
List	Make a list of words, sentences or comments
Outline	Identify or describe the main points
Plan	Think about, organise and present information in a logical way. This could be presented in writing, as diagrams or an illustration.
Show	Give information that includes clear knowledge about the subject
State	Give the main points in brief, clear sentences
Use	Take an item, recourse or piece of information and link it to the question or task.

SECTION FOUR - SUPPORT

Support Materials

The following support materials are available to assist with the delivery of this qualification and are available on our website, via ACE360 or on request.

- Guidance Handbook for Employers, Learners, and Training Providers
- Learning resources
- Guidance materials by KSB

We do not explicitly endorse any source of learning materials however there is a wealth of material available on the topic in academic textbook, media and social domains. Training Providers are cautioned to be circumspect when selecting sources.

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