

ITQAN Institute

Diploma in Inspection Fundamentals:
Civil Engineering

**Qualification Handbook:
City & Guilds Framework**



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Introduction to the Qualification

Who is the qualification for?

This qualification is for learners who wish to become a trainee technical inspector in the Kingdom of Saudi Arabia. Learners select one pathway from five options: mechanical inspection, electrical inspection, welding inspection, civil inspection, and NDT inspection. The qualification covers a wide range of inspection topics within each pathway, allowing you to develop your knowledge and skills and providing a solid foundation for subsequent on the job training as a trainee inspector within KSA

What does the qualification cover?

This qualification covers basic theoretical aspects of engineering and their application to inspection. It also provides ample opportunity for practical application of the knowledge and skills acquired. All areas are compulsory. Delivery of the qualification includes site visits where learners can enhance their understanding of specific inspection processes in industrial settings.

What opportunities for progression are there?

Progression from these qualifications is into the workplace as trainee inspectors.

Who did we develop the qualification with?

This qualification has been developed by City & Guilds in conjunction with The Inspection Technology and Quality Assurance National Institute of Saudi Arabia

Structure

The Diploma is split into two (2) x 22- week sessions. Trainee are expected to attend all sessions and complete all activities and examinations.

To achieve the Diploma in Inspection Fundamentals (Civil Engineering), learners must mandatory units 101-110 plus optional units 132-138.

City & Guilds Unit Number	Unit title	GLH	Credit
101	Principles of Inspection	66	6
102	Principles of Quality Management	66	6
103	Engineering inspection	66	6
104	Use of IT in a work setting	44	6
105	Health and safety for the inspector	66	6
106	Technical English for inspectors	44	6
107	Technical documentation	66	6
108	Technical drawings	66	6
109	Complete inspection documentation	66	6
110	Visual inspection	66	6

City & Guilds Unit Number	Unit title	GLH	Credit
132	Fundamentals of surveying	88	9
133	Concrete technology	88	9
134	Roads and pavements	88	8
135	Fundamentals of foundation design	88	8
136	Reinforced concrete	88	9
137	Structural steel	88	8
138	Buildings	88	9

- **[CIVIL-ITQAN Curriculum Learning Outcomes:-](#)**

❖ **[Click here](#)** to know the detailed learning outcomes

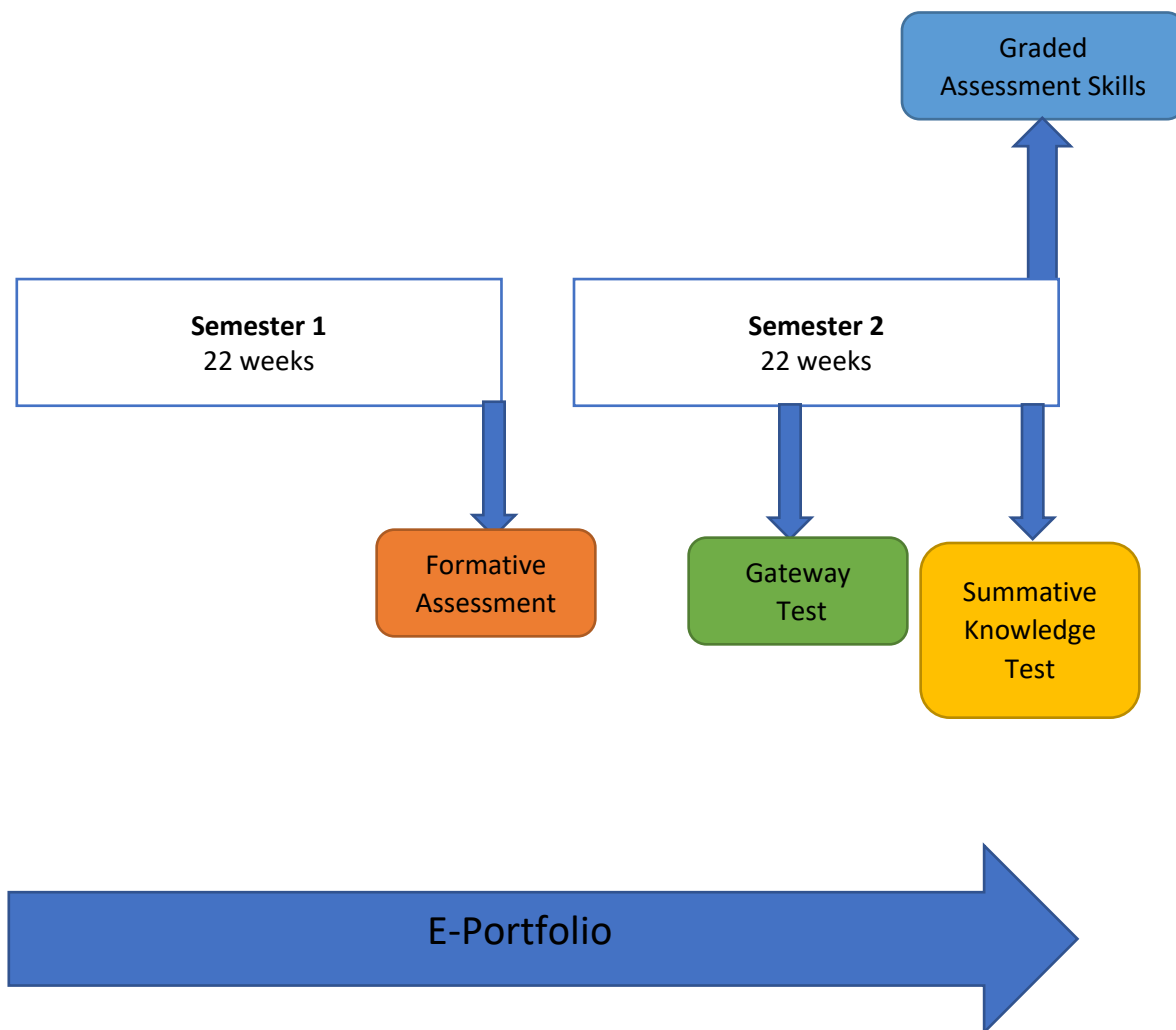
Assessment Types

Within the Diploma there are multiple assessment types:

- Formative assessment
- Knowledge assessment
- Portfolio assessment
- Gateway assessment
- Skills assessment

Assessment strategy

The proposed assessment arrangements are illustrated in diagram below:



The approach is summarised as follows:

Semester 1:

There will be one formative knowledge test at the end of trimester 1. This assessment will not contribute towards qualification grading and will not act as a gateway assessment (although ITQAN may choose to use it to assess the need for additional learner support).

Semester 2:

There will be one “gateway” skills assessment in week 11 or 12. This will be a pass/fail assessment of practical competency

There will be a summative test of underpinning knowledge (a “knowledge test”) at the end of semester 2. This test will be scored and will contribute 20% towards qualification grading. There will be a graded skills assessment at the end of semester 2. This assessment will be graded and will contribute 50% towards qualification grading.

All trimesters:

Learners will be required to maintain a cumulative portfolio of evidence to supplement their knowledge tests and skills assessments. This assessment will contribute 30% towards qualification grading, 10% from each trimester.

Grading

The key features of grading are:

1. The qualification will have four grades: x Distinction x Merit x Pass x Fail/Not Passed Yet
2. Summative knowledge tests will have scored outcomes.
3. Graded skills assessments will have graded outcomes.
4. Portfolio will have graded outcomes.
5. A Grade Point Average or GPA will be used to show learners’ overall level of achievement and to calculate the qualification outcome for each learner. The GPA is calculated from the learner’s attainment over the three scored/graded assessments (the portfolio, the summative knowledge test and the skills assessment).
6. Individual units are not graded.
7. Gateway skills assessment are pass/fail but do not otherwise contribute to the overall qualification grade.

The Grade Point Average

A Grade Point Average or GPA will be used to show learners' overall level of achievement and to calculate their qualification grade. The GPA is calculated as the learner's average attainment over the three scored/graded assessments (the summative knowledge test, the skills assessment and the graded portfolio). The cut score boundaries (measured on the GPA) for the four qualification outcomes are shown in the following table (for completeness, the table also includes the percentage score equivalents to GPA for each cut score):

Classification	Percentage score		GPA	
	Low	High	Low	High
Distinction	80%	100%	3.2	4
Merit	70%	79%	2.8	3.16
Pass	50%	69%	2	2.76
Fail	0%	49%		1.96

Recording Evidence

Trainees are able to submit paper-based or electronic method of recording evidence. This must be agreed with the trainer/ Vice Dean. Trainees and Trainers must ensure all documentation is submitted on time.

Completed work will be graded, feedback will then be given to the trainee for future development. Then, the work will go through the ITQAN internal verification (IV) process to ensure the required standards have been met. Also, some work will be sent to an external examiner (EE).

Understanding Delivery

The Learning Outcomes for the unit should be delivered in sequence as presented as they represent escalating complexity and interdependence. The unit may be delivered by a combination of lectures, tutorial work and practical laboratory work and refer as often as possible to the engineering inspection context.

Learners should be made aware that they will spend a lot of their working life applying Visual Inspection techniques and that a sound knowledge of their background, principles, limitations, codes and standards will be very useful.

ITQAN Curriculum Learning Outcomes			
#	Unit Code	Learning Outcome	Topics
A - Mandatory Units			
1	101	<ol style="list-style-type: none"> 1. Understand the roles and the responsibilities of the inspector 2. Understand types of inspection 3. Know types of non-conformities 	<ol style="list-style-type: none"> 1.1 attributes of the inspector 1.2 safety aspects of inspection 2.1 phases of inspection 2.2 inward / outward inspection 2.3 test plans and sampling 3.1 deterioration 3.2 manufacture
2	102	<ol style="list-style-type: none"> 1. Understand the differences between quality assurance and quality control 2. Understand the principles and application of quality assurance 3. Understand the principles and application of quality control 	<ol style="list-style-type: none"> 1.1 quality assurance and quality control 2.1 quality assurance 3.1 quality control
3	103	<ol style="list-style-type: none"> 1. Understand the ITQAN seven basic skills of inspection 2. Understand the personal and professional skills required to work as an Inspector 3. Understand the role of individual departments and how these relate to the work of an Inspector 4. Apply the seven basic skills, professional skills and technical knowledge to inspection work 	<ol style="list-style-type: none"> 1.1 ITQAN seven basic skills 2.1 personal skills 2.2 professional skills 3.1 the relationship between other departments and the role of the Inspector 4.1 inspection activities

4	104	<ol style="list-style-type: none"> 1. Understand the principles and concepts of computer applications in a work setting 2. Understand the use of a range of storage devices in a work setting 3. Understand how to input and extract information, produce and store documents 4. Use email and internet to search, download and send information 5. Understand how to use IT safely in a work setting 	<ol style="list-style-type: none"> 1.1 principles and concepts of computer applications 1.2 correct operation of computer systems in a work setting 1.3 carrying out, recording and reporting upon inspection activities using IT <ol style="list-style-type: none"> 2.1 technical storage devices 2.2 transfer of information between applications using storage media <ol style="list-style-type: none"> 1.1 inputting and extracting information 1.2 producing documents 1.3 storing documents 1.1 use of email and the internet 1.1 workstation height and layout 5.2 occupational Health and Safety (OHS) guidelines related to the use of computing equipment
5	105	<ol style="list-style-type: none"> 1. Understand health and safety for inspectors 2. Carry out simple risk assessments 	<ol style="list-style-type: none"> 1.1 principles of health and safety 2.1 carry out simple risk assessments
6	106	<ol style="list-style-type: none"> 1. Understand and interpret technical information 2. Communicate technical information with others 	<ol style="list-style-type: none"> 1.1 understand and use common inspection terminology 1.2 understand readings from equipment 2.1 communicating technical information with colleagues 2.2 communicating in writing and verbally with others using established inspection vocabulary
7	107	<ol style="list-style-type: none"> 1. Understand technical documentation 2. Work with technical documents 	<ol style="list-style-type: none"> 1.1 understand technical documentation 2.2 work with technical documents
8	108	<ol style="list-style-type: none"> 1. Understand the different types of drawings 	<ol style="list-style-type: none"> 1.1 international standards 1.2 principles of technical drawings 1.3 types of technical drawings

		<p>2. Understand the different uses of technical drawings</p>	<p>2.1 design 2.2 installation 2.3 commissioning 2.4 inspection</p>
9	109	<p>1. Identify technical documentation 2. Complete technical documentation</p>	<p>1.1 types of inspection documentation 2.1 complete technical documentation</p>
10	110	<p>1. Understand the development of visual inspection 2. Understand the principles of vision 3. Understand the purpose of visual inspection 4. Carry out and report visual inspection 5.</p>	<p>1.1 overview of visual inspection 2. 1 the mechanics of vision 2.2 issues affecting vision 3.1 types of visual inspection 3.2 non-conformities identified through visual inspection 4.1 carry out visual inspection 4.2 report on visual inspection</p>
B- Specialty Units			

<p>11</p>	<p>111</p>	<p>1 Know the types of survey, common terminology and associated measuring units 2 Carry out levelling surveys and produce drawings 3 Carry out linear surveys and plot results 4 Measure angles and produce results from calculations 5 Know current and emerging technologies in topographical surveys</p>	<p>1.1 common types of surveys 1.2 equipment used for basic surveys 1.3 surveying terminology 1.4 units used in surveying 2.1 levelling survey terminology 2.2 set up and test levels 2.3 carry out simple level surveys 2.4 produce drawings from level surveys 3.1 linear survey terminology 3.2 linear surveys 3.3 plot results 4.1 angular measurement terminology 4.2 angular measurement calculations 4.3 setting up, checking and reading angles with a theodolite 4.4 survey of control stations 5.1 current and emerging technologies 5.2 advantages and disadvantages of current and emerging technologies</p>
<p>12</p>	<p>133</p>	<p>1 Know the constituents of concrete and common concrete terminology 2 Understand the production processes and properties of the constituents of concrete 3 Understand the requirements for fresh and hardened concrete 4 Review mix designs for concrete 5 Know the process for approving mix design</p>	<p>1.1 constituents of concrete 1.2 concrete terminology 2.1 cement 2.2 aggregates 2.3 water 2.4 concrete admixtures 3.1 fresh concrete 3.2 hardened concrete 3.3 standard tests for fresh concrete 3.4 tests for hardened concrete 4.1 factors for design requirements 5.1 Mixing concrete 5.2 Grading of aggregates 5.3 Mixing plant 5.4 Conformity with specifications</p>
<p>13</p>	<p>134</p>	<p>1 Know the types of roads and pavements and common terminology 2 Understand the design of roads and pavements 3 Understand road and pavement construction drawings 4 Know road and pavement construction methods 5 Understand the safety and quality assurance requirements for road and pavement construction</p>	<p>1.1 types and uses of roads and pavements 1.2 roads and pavement terminology 2.1 design factors for roads and pavements 2.2 design and materials selection for flexible pavements 2.3 design and materials selection for rigid pavements 2.4 design and materials selection for paved areas 3.1 construction drawings 3.2 detail drawings 4.1 plant types</p>

			<ul style="list-style-type: none"> 5.1 dimensional control 5.2 construction methods 5.3 materials 5.4 asphalt mixing plant
14	135	<ul style="list-style-type: none"> 1 Know the purpose of foundations and associated terminology 2 Know how rocks are classified, formed and tested, providing design recommendations 3 Know the types of foundation, their application and design 4 Understand the fundamentals of earthworks 5 Know the fundamentals of pile installation 6 Understand the safety and quality assurance requirements for foundation construction 	<ul style="list-style-type: none"> 1.1 purpose of foundations 1.2 common foundation terminology 2.1 definition and classification of common rock types 2.2 common rock formations 2.3 soil investigation techniques and tests 2.4 results of soil investigations 3.1 foundation types and application 3.2 foundation design 4.1 earthwork operations 4.2 excavation plant 5.1 types of piles 5.2 piling equipment 5.3 procedures for pile installation 5.4 marine piling requirements 6.1 dimensional control 6.2 construction methods 6.3 materials deliveries 6.4 pile testing
15	136	<ul style="list-style-type: none"> 1 Know the purpose of reinforcing concrete, materials used and types 2 Know the methods of transporting, placing, compacting, finishing and curing concrete used for reinforced concrete construction 3 Know the types, properties and uses of materials used to reinforce concrete 4 Understand the fundamentals of the design of reinforced concrete elements 5 Understand reinforced concrete drawings and bending schedules 6 Know the production methods for pre-cast reinforced concrete 7 Know formwork used for reinforced concrete construction 8 Understand the safety and quality assurance requirements for reinforced concrete construction 	<ul style="list-style-type: none"> 1.1 reasons for reinforcing concrete 1.2 materials used to reinforce concrete 2.1 transporting concrete 2.2 placing concrete 2.3 compacting concrete 2.4 finishing concrete 2.5 curing concrete 2.6 common problems 2.7 problems caused by hot weather 3.1 reinforcing steel 3.2 pre-stressing steel 4.1 design principles 4.2 basic design of elements 5.1 design drawings 5.2 bending schedules 6.1 pre-cast reinforced concrete 7.1 formwork 7.2 release agents 7.3 safety aspects of formwork 8.1 dimensional control 8.2 construction methods 8.3 materials deliveries

16	137	<p>1 Know types of structural steel structures and common terminology</p> <p>2 Know the materials and components used for structural steelwork</p> <p>3 Understand design considerations of simple elements of structural steelwork</p> <p>4 Understand structural steelwork drawings</p> <p>5 Know fabrication methods for structural steelwork</p> <p>6 Know corrosion protection methods for structural steelwork</p> <p>7 Know fire protection methods for structural steelwork</p> <p>8 Understand the safety and quality assurance requirements for structural steelwork</p>	<p>1.1 structural steel structures</p> <p>1.2 common terminology</p> <p>2.1 structural shapes</p> <p>2.2 types of steel</p> <p>2.3 other materials and components</p> <p>2.4 other applications of steel in construction</p> <p>3.1 loads</p> <p>3.2 design principles</p> <p>3.3 design of simple elements</p> <p>4.1 design drawings</p> <p>4.2 fabrication drawings</p> <p>4.3 connection details</p> <p>4.4 erection drawings</p> <p>5.1 application of CAD/CAM</p> <p>5.2 fabrication methods</p> <p>6.1 corrosion mechanisms</p> <p>6.2 protection methods</p> <p>6.3 selection of protection methods</p> <p>7.1 strength and temperature</p> <p>7.2 fire protection materials</p> <p>7.3 inspection</p> <p>8.1 dimensional control</p> <p>8.2 construction methods</p> <p>8.3 materials deliveries</p>
17	138	<p>1 Know the factors that influence building design</p> <p>2 Apply the requirements of Building Codes to buildings</p> <p>3 Know building services incorporated in buildings</p> <p>4 Know interior and exterior finishes for buildings</p> <p>5 Understand building design and construction drawings</p> <p>6 Understand the safety and quality assurance requirements for building construction</p>	<p>1.1 influencing factors</p> <p>2.1 Saudi Building Code (SBC)</p> <p>2.2 other Building Codes</p> <p>2.3 application of Building Codes</p> <p>3.1 plumbing</p> <p>3.2 electricity</p> <p>3.3 drainage</p> <p>3.4 gas</p> <p>3.5 ventilation and air conditioning</p> <p>4.1 interior finishes</p> <p>4.2 exterior finishes</p> <p>5.1 design and construction drawings</p> <p>6.1 dimensional control</p> <p>6.2 construction methods</p> <p>6.3 materials deliveries</p>