Qualification Specification

Level 3 Diploma in Engineering Surveying

Contents

Introduction

The Level 3 Diploma in Engineering Surveying qualification is appropriate for individuals who are either experienced surveyors who can collect survey data from the real world to create accurate maps of existing detail, or engineering surveyors who can set out designed data from plans into the real world.

The awarding organisation for this qualification is ProQual Awarding Body and the regulatory body is the Office of Qualifications and Examinations Regulation (Ofqual). The specification for these qualifications has been approved by the Welsh Government for use by centres in Wales.

Entry Requirements

There are no formal entry requirements for this qualification. Centres should carry out an **initial assessment** of candidate skills and knowledge to identify any gaps and help plan the assessment.

Qualification Profile

Qualification title	**ProQual Level 3 Diploma in Engineering Surveying**
Ofqual qualification number	603/1157/5
Level	3
Total Qualification Time	170 hours (150 GLH)
Assessment	Pass or fail Internally assessed and verified by centre staff External quality assurance by ProQual verifiers
Qualification start date	1/3/17
Qualification end date	

Qualification Structure

Candidates must complete the 5 Mandatory units.

L/615/5308	Introduction to Surveying
R/615/5309	Understanding Levelling in Surveying
J/615/5310	Using a Total Station in Surveying
L/615/5311	Using Global Navigation Satellite Systems
R/615/5312	Setting out and other Construction related Survey Technologies

Centre Requirements

Centres must be approved to offer this qualification. If your centre is not approved please complete and submit form **ProQual Additional Qualification Approval Application**.

Staff
Staff delivering this qualification must be appropriately qualified and occupationally competent.

Assessors/Internal Quality Assurance
For each competence-based unit centres must be able to provide at least one assessor and one internal quality assurance verifier who are suitably qualified for the specific occupational area. Assessors and internal quality assurance verifiers for competence-based units or qualifications will normally need to hold appropriate assessor or verifier qualifications, such as:

- ProQual Level 3 Certificate in Teaching, Training and Assessing
- Award in Assessing Competence in the Work Environment
- Award in Assessing Vocationally Related Achievement
- Certificate in Assessing Vocational Achievement
- Award in the Internal Quality Assurance of Assessment Processes and Practices
- Certificate in Leading the Internal Quality Assurance of Assessment Processes and Practices

Support for Candidates

Materials produced by centres to support candidates should:

- enable them to track their achievements as they progress through the learning outcomes and assessment criteria;
- provide information on where ProQual's policies and procedures can be viewed;
- provide a means of enabling Internal and External Quality Assurance staff to authenticate evidence

Assessment

Candidates must demonstrate the level of knowledge and competence described each of the units. Assessment is the process of measuring a candidate's knowledge and understanding against the standards set in the qualification.

Each candidate is required to produce evidence which demonstrates their achievement of all of the learning outcomes and assessment criteria for each unit.

Evidence can include:

- assignments/projects/reports
- worksheets
- portfolio of evidence
- video evidence
- record of oral and/or written questioning
- candidate test papers

Learning outcomes set out what a candidate is expected to know, understand or be able to do.

Assessment criteria specify the standard a candidate must meet to show the learning outcome has been achieved.

Learning outcomes and assessment criteria for this qualification can be found from page 7 onwards.

Internal Quality Assurance

An internal quality assurance verifier confirms that assessment decisions made in centres are made by competent and qualified assessors, that they are the result of sound and fair assessment practice and that they are recorded accurately and appropriately.

Adjustments to Assessment

Adjustments to standard assessment arrangements are made on the individual needs of candidates. ProQual's Reasonable Adjustments Policy and Special Consideration Policy sets out the steps to follow when implementing reasonable adjustments and special considerations and the service that ProQual provides for some of these arrangements.

Centres should contact ProQual for further information or queries about the contents of the policy.

Results Enquiries and Appeals

All enquiries relating to assessment or other decisions should be dealt with by centres, with reference to ProQual's Enquiries and Appeals Procedures.

Certification

Candidates who demonstrate achievement of the qualification will be awarded a certificate giving the full qualification title -

ProQual Level 3 Diploma in Engineering Surveying

Claiming certificates

Centres may claim certificates for candidates who have been registered with ProQual and who have successfully achieved the required number of units for a qualification. All certificates will be issued to the centre for successful candidates.

Replacement certificates

If a replacement certificate is required a request must be made to ProQual in writing. Replacement certificates are labelled as such and are only provided when the claim has been authenticated. Refer to the Fee Schedule for details of charges for replacement certificates.

Learning Outcomes and Assessment Criteria

Unit L/615/5308
Introduction to Surveying

Learning Outcomes – the learner will		Assessment Criteria – the learner can
1 Understand basic health and safety legislation relevant to surveying	1.1	Identify minimum health and safety and safe working requirements when conducting geospatial and engineering surveying
	1.2	Describe how to carry out a dynamic Site Risk Assessment
2 Understand numerical and mathematical techniques for surveying	2.1	Demonstrate solving a right angle triangle
	2.2	Demonstrate calculation of bearing and distances from coordinates; use trigonometry to calculate horizontal distance and difference in height from observed angles and slope distances
	2.3	Explain the importance of accuracy, precision and checking in geospatial and engineering surveying
	2.4	Explain the difference between: • accuracy and precision • good geometry and bad geometry
	2.5	Demonstrate the use of geometry in relation to angular and grid co-ordinates (Polar and Rectangular)
3 Understand how organisations are managed	3.1	Explain the management structure of: • their employer • their workplace
4 Understand the setting up of control networks in surveying	4.1	Demonstrate the location of permanent control – i.e. show the difference between good locations and poor locations
	4.2	Explain the difference between horizontal and vertical control
	4.3	Identify types of control marker
	4.4	Explain the importance of accuracy and reliability of control

5 Understand how survey drawings are interpreted	5.1 Explain the relationship of scale to plot size 5.2 Explain the coordination of systems: National Grid, local grid 5.3 Explain different drawing and data formats

Assessment

There must be valid, authentic and sufficient for all the assessment criteria. However, one piece of evidence may be used to meet the requirements of more than one learning outcome or assessment criterion.

Unit R/615/5309
Understanding Levelling in Surveying

Learning Outcome - The learner will:	Assessment Criterion - The learner can:
1 Understand errors when levelling in surveying	1.1 Identify sources of error in levelling 1.2 Demonstrate a two peg test 1.3 Explain the results of a two peg test
2 Understand different types of level	2.1 Demonstrate different types of level: • optical • digital • laser levels
3 Understand different datums used in surveying	3.1 Explain why different datums would be used: • ordnance datum • site datum • Ordnance Survey bench mark • temporary bench mark
4 Be able to book levelling data	4.1 Demonstrate either rise and fall or height of collimation booking 4.2 Demonstrate reduction of level data

Assessment

There must be valid, authentic and sufficient for all the assessment criteria. However, one piece of evidence may be used to meet the requirements of more than one learning outcome or assessment criterion.

Unit J/615/5310
Using a Total Station in Surveying

Learning Outcome - The learner will:	Assessment Criterion - The learner can:
1 Know how to use a total station in surveying	1.1 Use a total station to observe and record angles and distances
	1.2 Use different methods of distance measurement
	1.3 Explain automatic pointing technology
	1.4 Apply and explain atmospheric corrections to their total station
	1.5 Understand about care of equipment
2 Understand control traverse observation	2.1 Explain: • two face observation • purpose of rounds of angles • value of redundant data
	2.2 Observe and book rounds of horizontal and vertical angles and slope distances and know what to do with them
	2.3 Observe a resection
	2.4 Explain how to assess the accuracy of the result of the resection
3 Understand how to compute traverse data	3.1 Compute traverse data from their observations: • bowditch adjustment • least squares adjustment
	3.2 Explain how to assess the quality of results for both methods of calculation
4 Know how to record and output total station survey data	4.1 Record data
	4.2 Identify different data formats used to output data
	4.3 Output and present survey data

Assessment

There must be valid, authentic and sufficient for all the assessment criteria. However, one piece of evidence may be used to meet the requirements of more than one learning outcome or assessment criterion.

Unit L/615/5311
Using Global Navigation Satellite Systems

Learning Outcome - The learner will:	Assessment Criterion - The learner can:
1 Have an understanding of Global Navigation Satellite Systems (GNSS) theory and good practice when observing	1.1 Describe the importance of satellite geometry
	1.2 Explain how to avoid the effect of multipath and cycle slips on GNSS observations
2 Know how to use GNSS in geospatial and engineering surveying	2.1 Describe how GNSS digital surveying equipment is used in geospatial and engineering surveying
	2.2 Demonstrate the use of GNSS to locate their position in static and network Real Time Kinematic (RTK) modes
3 Understand the limitations of accuracy	3.1 Explain how GNSS should be used for recording detail
	3.2 Demonstrate their understanding of when GNSS is not an appropriate method to use
	3.3 Explain how to assess results of RTK observation

Assessment

There must be valid, authentic and sufficient for all the assessment criteria. However, one piece of evidence may be used to meet the requirements of more than one learning outcome or assessment criterion.

Unit R/615/5312
Setting Out and Other Construction Related Survey Technologies

Learning Outcome - The learner will:	Assessment Criterion - The learner can:	
1 Have a basic knowledge of 3D Building Information Modelling	1.1	Explain the basic concepts of 3D Building Information Modelling
2 Understand the use of construction drawings in setting out	2.1	Explain the relationship of scale to plot size
	2.2	Demonstrate their understanding of coordinate systems: National Grid, local grid
	2.3	Explain the relationship of annotated dimensions to grid and design elements
	2.4	Use drawing and data formats
3 Know how to perform setting out tasks	3.1	Select appropriate (fit for purpose) equipment for setting out
	3.2	Explain inaccuracies that may result from the choice of equipment
	3.3	Upload setting out data to the selected instrument
	3.4	Demonstrate setting out techniques: by coordinate, radial, offset
	3.5	Demonstrate setting out of profiles
	3.6	Identify setting out accuracies
4 Know how to carry out Original Ground Level (OGL) and as built survey	4.1	Download and process survey data
5 Understand the use of laser scanning in surveying	5.1	Explain how laser scanning technology is used in surveying
6 Understand the importance of utility detection surveys in a construction environment	6.1	Explain the purpose of detecting underground utilities
	6.2	Explain issues with accuracies of location of utilities
	6.3	Explain how services are identified by various survey methods: taping, total station

Assessment

There must be valid, authentic and sufficient for all the assessment criteria. However, one piece of evidence may be used to meet the requirements of more than one learning outcome or assessment criterion.

ProQual Awarding Body
ProQual House
Annie Med Lane
South Cave
HU15 2HG
UK

Tel: +44(0)1430 423822

www.proqualab.com

enquiries@proqualab.com