



QQI

Quality and Qualifications Ireland
Dearbhú Cáilíochta agus Cáilíochtaí Éireann

Component Specification NFQ Level 6

Small Scale Wind Systems Implementation 6N0310

1. Component Details

Title	Small Scale Wind Systems Implementation
Teideal as Gaeilge	Mionchórais Ghaoithe a chur i bhFeidhm
Award Type	Minor
Code	6N0310
Level	6
Credit Value	10
Purpose	The purpose of this award is to equip the learner with the knowledge, skill and competence to implement wind turbine projects for small systems with a rotor swept area of up to 200 m ² , according to the applicable standards, legislation, guidelines, and manufacturer's specifications, whilst working autonomously.
Learning Outcomes	Learners will be able to: <ol style="list-style-type: none">1 Summarise the technologies associated with small wind turbines as defined in IEC EN 61400-2, including the characteristics of the main system components2 Describe the factors affecting wind energy output from small scale wind systems including the rotor swept area and wind speed3 Summarise the planning requirements for small wind turbines to include height restrictions, separation distances, Section 5 declarations and noise assessment, identifying circumstances where exemptions may apply

- 4 Identify hazards associated with small wind turbine operation mitigating such hazards through design for aerodynamic and static loads and turbine siting with due consideration for safety zones around installations
- 5 Describe network connection procedures for microgeneration and generators up to 50 kW to include "inform and fit" procedures, applicable standards and metering arrangements
- 6 Summarise the main electrical components of a wind turbine installation describing associated electrical hazards
- 7 Summarise relevant legislation, standards and regulation to include CE marking and New Approach Directives, EN 61400-2, EN 61400-11, EN 61400-12, EN50438, Building Regulations Part L, the small wind certification council and the microgeneration certification scheme
- 8 Describe the recommended installation sequence for wind turbines identifying relevant standards and guidelines applicable to each phase of installation
- 9 Describe control mechanisms for small wind turbines to include battery dumps, rotor aerodynamics, yaw mechanisms, electrical and mechanical braking systems for overspeed protection, and shut system down
- 10 Describe typical maintenance procedures to include cleaning blades, applying the correct torque to bolts, greasing and replacing bearings and visual inspection of electrical connections
- 11 Describe wind turbine erection techniques including tilt up and crane lift, and gin pole anchor layout and construction for a range of tower types giving due consideration to working at height and prevailing weather conditions
- 12 Propose an appropriate foundation construction method based on manufacturer's data, foundation specifications, and knowledge of factors affecting foundation requirements
- 13 Optimise power output using data collected from anemometry
- 14 Use the recommended tools for deployment of all required components of a small wind turbine system in accordance with manufacturer's instructions

- 15 Carry out a feasibility study for a small wind turbine to include a resource assessment and economic evaluation based on manufacturer's data sheets, wind atlas data, and tariffs, and local adjustment factors such as obstacles, terrain effect and site roughness
- 16 Complete a design layout for a small wind system to include specifications for wind turbine siting, cable runs, inverter and dump load location
- 17 Assess the conformance of a small wind turbine installation in accordance with relevant standards
- 18 Test key safety systems including the network interface, overspeed protection, safe shut down and braking mechanisms.

Assessment

General Information

All assessment should be planned in accordance with the programme assessment strategy developed as part of the programme submission for validation. See **Policies and Criteria for Validation of Programmes**. Assessment should be undertaken consistently and reflect current assessment guidelines. See www.gqi.ie.

All FET assessment is criterion referenced. Successful achievement of the award is based on learners attaining the required standards of knowledge, skill or competence consistent with the **minimum intended programme learning outcomes**.

The techniques set out below are considered the optimum approach to assessment for this component. In exceptional circumstances providers may identify alternative assessment techniques through the provider's application for programme validation which are reliable and valid but which are more appropriate to their context.

Assessment of a number of components may be integrated across programmes for delivery, provided that the learning outcomes of each minor award are assessed.

Group or team work may form part of the assessment, provided each learner's achievement is separately assessed.

All providers are required to submit an assessment plan as part of their application for programme validation. Assessment Plans will include information relating to scheduling and integration of

assessment. See current FET validation guidelines at www.qqi.ie.

Assessment Techniques

In order to demonstrate that they have reached the standards of knowledge, skill and competence identified in all the learning outcomes, learners are required to complete the assessment(s) below.

The assessor is responsible for devising assessment instruments (e.g. project and assignment briefs, examination papers), assessment criteria and mark sheets, consistent with the techniques identified below and QQI's assessment requirements.

Programme validation will require providers to map each learning outcome to its associated assessment technique. All learning outcomes **must** be assessed and achieved in accordance with the **minimum intended module learning outcomes** set out in the validated programme.

Assignment	40%
Examination - Theory	40%
Skills Demonstration	20%

Description

Assignment

An assignment is an exercise carried out in response to a brief with specific guidelines as to what should be included. An assignment is usually of short duration and may be carried out over a specified period of time.

The assessor will devise assignment(s) based on learning outcomes 12, 13, 15 and 16.

This assessment must be passed in order to achieve this award.

Examination - Theory

An examination provides a means of assessing a learner's ability to recall and apply knowledge, skills and understanding within a set period of time and under clearly specified conditions.

A theory-based examination assesses the ability to recall, apply and understand specific theory and knowledge.

The assessment will include a theory based examination based on learning outcomes 1-11. This assessment must be passed in order to achieve this award.

Skills Demonstration

A skills demonstration is used to assess a wide range of practical based learning outcomes including practical skills and knowledge. A skills demonstration will require the learner to complete a task or series of tasks that demonstrate a range of skills.

The assessor will devise a skill demonstration based on learning outcomes 14, 17 and 18. This assessment must be passed in order to achieve this award.

The skills demonstration will be terminated if learner actions result in potentially unsafe practice. In this case the learner will fail to meet the standard.

Recognition of Prior Learning (RPL)

To support the development and implementation of RPL with regard to access, granting credit/exemptions and achievement of awards/parts of awards, providers should refer to **QQI's Statutory Guidelines for Quality Assurance**, the **Policies and Criteria for Validation of Programmes** and the **Principles and Operational Guidelines for the Recognition of Prior Learning in Further and Higher Education and Training** available at www.qqi.ie

Grading

Pass	50% - 64%
Merit	65% - 79%
Distinction	80% - 100%

Specific Validation Requirements

The provider must have all of the following in place to offer this award:

A current wind atlas and on-line tools for wind resource assessment

1. Access to an operational small wind turbine installation capable of being lowered for inspection and maintenance
2. A variable speed and output generator connected to an inverter with a simulated network connection
3. Access to a model of foundation for a small wind turbine which is fit for purpose

Supporting Documentation

1. EN 61400-2 - Wind Turbines -- Part 2: Design requirements for small wind turbines
2. EN 61400-12 Wind turbines -- Part 12-1: Power performance measurements of electricity producing wind turbines

3. Guide to connecting renewable and CHP (combined heat and power) generators to the network, available from Sustainable Energy Ireland
4. Applicable planning and development regulations: SI No. 83 of 2007, SI No. 235 of 2008

Access

To access programmes leading to this award the learner should have reached the standards of knowledge, skill and competence associated with the preceding level of the National Framework of Qualifications. This may have been achieved through a formal qualification or through relevant life and work experience.

Transfer

Successful completion of this component award enables the learner to transfer to programmes leading to other certificates where this component is a mandatory or an elective requirement.

2. FET Award Standards

QQI award standards are determined within the National Framework of Qualifications (NFQ), <http://www.nfq-qqi.com>. QQI determines standards for the education and training awards that it makes itself and that are made by providers to whom it has delegated authority to make an award. Providers offering programmes leading to QQI awards **must** have their programme(s) validated in accordance with current validation policy (see www.qqi.ie).

Award standards are designed to be consistent with the NFQ’s award classes i.e. major, special purpose, supplemental and minor awards. They are expressed in terms of **learning outcomes** i.e. concise statements of what the learner is expected to know or be able to do in order to achieve a particular award. Learning outcomes for FET awards are contained within the associated specifications:

AWARD CLASS	STANDARDS	AWARDS
Major Award	Certificate Specification	Certificate (Levels 1 to 5) Advanced Certificate (Level 6)
Supplemental Award	Supplemental Specification	Supplemental Certificate (Level 3 to 6)
Special Purpose	Specific Purpose Specification	Specific Purpose Certificate (Levels 3 to 6)
Minor Award	Component Specification	Component Certificate (Levels 1 to 6)

Award standards are thresholds, they describe standards of knowledge, skill or competence to be acquired, and where appropriate, demonstrated, by a learner before an award may be made.

Award standards will be reviewed from time to time as necessary. Minor changes may be made by the QQI executive outside the review cycle where necessary. Changes to standards are published on QQI’s website. Providers with validated programmes and providers with delegated authority to make awards are responsible for monitoring relevant standards and making necessary responses to changes.

3. FET Credit

Every FET certificate and component specification includes an FET credit value (Table 1). FET credit is quantified in multiples of 5 FET credits (up to 50 hours of learner effort). Learner effort is based on the time taken by typical learners at the level of the award to achieve the learning outcomes for the award. It includes all learning time involved including: guided learning hours, self-directed learning and assessment.

Table 1: FET Credit Values

NFQ Level	Major Awards Credit Values	Default Credit Values Minor Awards	Other Permitted Minor Award Credit Values	Special Purpose and Supplemental Award Credit Value Ranges
1	20	5	10	
2	30	5	10	
3	60	10	5,20	>5 and <60
4	90	10	5,15,20	>5 and <90
5	120	15	5,10,30	>5 and <120
6	120	15	5,10,30	>5 and <120

Guide to Level

Learning outcomes at this level include a comprehensive range of skills which may be vocationally-specific and/or of a general supervisory nature, and require detailed theoretical understanding. The outcomes also provide for a particular focus on learning skills. The outcomes relate to working in a generally autonomous way to assume design and/or management and/or administrative responsibilities. Occupations at this level would include higher craft, junior technician and supervisor.

Strand	Sub-strand	Nature of learning
Knowledge	Breadth	Specialised knowledge of a broad area
	Kind	Some theoretical concepts and abstract thinking, with significant depth in some areas
Know How & Skill	Range	Demonstrate a comprehensive range of specialised skills and tools
	Selectivity	Formulate responses to well defined abstract problems
Competence	Context	Utilise diagnostic and creative skills in a range of functions in a wide variety of contexts
	Role	Exercise substantial personal autonomy and often take responsibility for the work of others and/or for the allocation of resources; form and function within, multiple and complex heterogeneous groups.
	Learning to Learn	Learn to take responsibility for own learning within a managed environment.
	Insight	Express an internalised, personal world view, reflecting engagement with others.

