Dearbhú Cáilíochta agus Cáilíochtaí Éireann
Quality and Qualifications Ireland

# Component Specification

## Mathematics

## NFQ Level 4

## 4N1987

### 1. Component Details

| | |
|---|---|
| **Title** | Mathematics |
| **Teideal as Gaeilge** | Matamaitic |
| **Award Class** | Minor |
| **Code** | 4N1987 |
| **Level** | 4 |
| **Credit Value** | 10 |
| **Purpose** | The purpose of this award is to equip the learner with the relevant knowledge, skill and competence to apply a range of mathematical skills and tools to a variety of contexts, with limited conceptual understanding. |
| **Units** | The Learning Outcomes are grouped into the following units:<br>1 NUMBER<br>2 GEOMETRY<br>3 ALGEBRA<br>4 DATA HANDLING |
| **Learning Outcomes** | Learners will be able to:<br>1 NUMBER<br>1.1 Discuss the application of number to familiar real life situations<br>1.2 Calculate conversions to include between currencies, between fractions, decimals and percentages, and from fractions to ratios and ratios to fractions, and |

from standard form to scientific notation and scientific notation to standard form

1.3 Use appropriate strategies such as rounding off, places of decimal, significant figures, estimation, percentage error, to give approximations, where numbers are from the set of natural numbers (N) and from the set of integers (Z)

1.4 Use a calculator with confidence to perform extended calculations, requiring functions such as addition, subtraction, multiplication, division, percent, square root, pi, 1/x, scientific notation keys, memory keys and the clear key, while following the conventions of precedence of operations

1.5 Demonstrate an understanding of the laws of indices and the rules of logarithms by using the laws and rules to simplify expressions, solve equations, and transpose formulae

1.6 Differentiate between simple interest and compound interest by applying the appropriate given formula to a range of savings and credit options

1.7 Apply the percentage function accurately to a range of everyday situations including gross income and net income, pay slips using appropriate statutory deductions, gross profit, net profit and loss on goods sold, VAT inclusive and VAT exclusive prices.

2 GEOMETRY

2.1 Describe simple geometric shapes associated with the home and workplace

2.2 Recognise folding symmetry and rotational symmetry in common shapes

2.3 Plot graphs of ordered pairs in the coordinate plane showing the relationship between two variables, using real life situations and the correct terminology

2.4 Use formulae for calculations in the coordinate plane correctly, including distance between two points, mid-point of a line segment, slope of a line, parallel lines, perpendicular lines, equation of a line, equation of a circle with centre (0,0) and radius r, and tangent to a circle

2.5 Construct, using drawing instruments, a variety of angles and simple geometric shapes to given criteria to include naming of angle types and sides associated with the shapes and angles

2.6 Solve practical problems by using the correct formula(e) to calculate the area and perimeter of a square, rectangle, triangle, and circle, giving the answer in the correct form and using the correct terminology

2.7 Solve practical problems by using the correct formula(e), to calculate the volume/capacity and surface area of a cube, cuboid, cylinder, cone, and sphere, giving the answer in the correct form and using the correct terminology

2.8 Apply standard axioms and theorems of geometry, including Pythagoras Theorem, to solve real life or simulated problems involving straight lines, parallel lines, angles, and triangles.

3 ALGEBRA

3.1 Discuss the presence of variables in a range of real life situations

3.2 Solve algebraic equations including linear equations of one variable, simultaneous linear equations of two unknowns, and linear inequalities of one variable

3.3 Solve quadratic equations using factors and the quadratic formula

3.4 Construct algebraic expressions and formulae for real life situations using the correct terminology and including rearrangement of formulae.

4 DATA HANDLING

4.1 Explain basic statistical concepts to include population, sample, dependent, independent and discrete variables

4.2 Present information from data collected from the world wide web or other methods, in graphical and tabular form, including bar charts, pie charts, trend graphs, cumulative frequency curves, histograms and frequency tables

4.3 Calculate the statistics for measuring averages and dispersion of an array of data, to include calculating the mean, mode, and median

4.4 Discuss findings, to include interpretation of results, and suggesting reasons for findings.

**Assessment**

**General Information**

Details of FET assessment requirements are set out in Assessment Guidelines for Providers.

All FET assessment is criterion referenced. Successful achievement of the award is based on learners attaining the required standards of knowledge, skill or competence.

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 FETAC's assessment requirements.

Programme validation will require providers to map each learning outcome to its associated assessment technique. See current FET validation guidelines at www.qqi.ie.

All learning outcomes **must** be assessed and achieved

| | |
|---|---|
| Portfolio / Collection of Work | 80% |
| Examination - Theory | 20% |

**Description**

**Portfolio / Collection of Work**

*A portfolio or collection of work is a collection and/or selection of pieces of work produced by the learner over a period of time that demonstrates achievement of a range of learning outcomes. The collection may be self-generated or may be generated in response to a particular brief or tasks/activities devised by the assessor.*

**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.*

**Recognition of Prior Learning (RPL)**

Learners may be assessed on the basis of their prior knowledge and experience. Providers must be specifically quality assured to assess learners by this means. To do so they must complete B10, see Provider's Quality Assurance Guidelines and be included on the Register of RPL approved providers. See RPL Guidelines at www.fetac.ie for further information and registration details.

**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:
Each candidate will be supplied with a set of Formulae and Tables at examination
1. Calculators are available to each candidate at examination
2.

**Supporting Documentation**

None

**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)<br>Advanced Certificate (Level 6) |
| Supplemental Award | Supplemental Specification | Supplemental Certificate<br>(Level 3 to 6) |
| Special Purpose | Specific Purpose Specification | Specific Purpose Certificate<br>(Levels 3 to 6) |
| Minor Award | Component Specification | Component Certificate<br>(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**

Independence is the hallmark of this level. Learning outcomes at this level correspond to a growing sense of responsibility for participating in public life and shaping one's own life. The outcomes at this level would be associated with first-time entry to many occupational sectors.

| **Strand** | **Sub-strand** | **Nature of learning** |
|---|---|---|
| Knowledge | Breadth | Broad range of knowledge |
| | Kind | Mainly concrete in reference and with some elements of abstraction or theory |
| Know How & Skill | Range | Demonstrate a moderate range of practical and cognitive skills and tools |
| | Selectivity | Select from a range of procedures and apply known solutions to a variety of predictable problems |
| Competence | Context | Act in familiar and unfamiliar contexts |
| | Role | Act with considerable amount of responsibility and autonomy |
| | Learning to Learn | Learn to take responsibility for own learning within a supervised environment |
| | Insight | Assume partial responsibility for consistency of self-understanding and behaviour |

*Extract from 'Determinations for the Outline National Framework of Qualifications': NQAI*