



Module Descriptor

Mathematics

Award Type: Minor
Award Level: 4
Award Code: 4N1987
Validation date 10th July 2012

Revision 1.0

Module Descriptor

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.

Module Duration: The learning effort required from a typical learner to successfully achieve the stated learning outcomes for the module is **100 hours**.

Learning Outcomes: By the end of this module, the learner will be able to:

1. NUMBER

- 1.1 Discuss the application of number to familiar real life situations.
- 1.2 Calculate conversions, to include between currencies, between fractions, decimals and percentages, 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 and 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, percentage, 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, and 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 co-ordinate plane showing the relationship between two variables, using real life situations and the correct terminology.
- 2.4 Use formulae for calculations in the co-ordinate 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, and 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.

Key Learning Points

Unit 1

Title Number

At the end of this unit, the learner will be able to:

Learning Outcome 1.1: Discuss the application of number to familiar real life situations.

Key Learning Points

- Basic addition, subtraction, multiplication, division and square root.
- Use of numbers in time, population, distance, area, height, volume, sport, money.
- Discussing real life examples of the application of numbers.

Learning Outcome 1.2: Calculate conversions, to include between currencies, between fractions, decimals and percentages, from fractions to ratios and ratios to fractions, and from standard form to scientific notation and scientific notation to standard form.

Key Learning Points

- Conversion of currencies to and from euros.
- Conversion of fractions to ratios and vice versa.
- Conversion of fractions to decimals, ratios and percentages and vice versa.
- Conversion of standard form numbers to scientific notation and vice versa.
- Application of conversions to real life situations.

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

Key Learning Points

- Estimating, giving approximations.
- Checking for accuracy of percentage (%) function.
- Percentage error.
- Decimals.
- Rounding off decimals to a number of places.
- Applying to natural numbers (N), integers (Z) and real numbers (R) where appropriate.

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

Key Learning Points

- Using the calculator, to include using the memory and clear keys.
- Basic mathematical functions and the order of calculations.
- Basic calculations involving addition, subtraction, multiplication, division, percentage, square root, pi, and 1/x.

Learning Outcome 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.

Key Learning Points

- Indices.
- Logarithms.
- Laws and rules of indices.
- Laws and rules of logarithms.
- Solving equations.
- Transposing formulae.
- The common use and application of indices and logarithms.

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

Key Learning Points

- Simple interest.
- Compound interest.
- Formulae for calculation of interest.
- Application of formulae for calculation of interest.
- Use of simple and compound interest in daily business transactions.

Learning Outcome 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, and VAT inclusive and VAT exclusive prices.

Key Learning Points

- Calculation of pay and pay deductions.
- Gross and net income.
- Pay slips using appropriate statutory deductions.
- Gross profit, net profit and loss on goods sold.
- Calculation of VAT on common goods and services.

Unit 2 Title Geometry

At the end of this unit, the learner will be able to:

Learning Outcome 2.1: Describe simple geometric shapes associated with the home and workplace.

Key Learning Points

- Geometric shapes.
- Simple and common geometric shapes.
- Simple and common geometric shapes seen daily.

Learning Outcome 2.2: Recognise folding symmetry and rotational symmetry in common shapes.

Key Learning Points

- Folding symmetry.
- Rotational symmetry.
- Folding symmetry and rotational symmetry in common shapes.
- Importance of symmetry in objects used daily.

Learning Outcome 2.3: Plot graphs of ordered pairs in the co-ordinate plane showing the relationship between two variables, using real life situations and the correct terminology.

Key Learning Points

- Terminology of graphs.
- Application of data to simple graphs of two variables.
- Planning and drawing graphs based on commonly found variables.

Learning Outcome 2.4: Use formulae for calculations in the co-ordinate 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.

Key Learning Points

- Calculation of distance between two points.
- Calculation of equation of a circle.
- Calculation of mid-point of a line segment.
- Calculation of slope of a line.
- Calculation of equation of a line.
- Understanding and drawing tangents to a circle.

Learning Outcome 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.

Key Learning Points

- Terminology of angles and shapes.
- Simple geometric shapes.
- Understanding and use of common drawing instruments.
- Use of drawing instruments to construct angles, circles and triangles.

Learning Outcome 2.6: Solve practical problems by using the correct formula(es) 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.

Key Learning Points

- Formula(e) to calculate the area of a square, rectangle, triangle and circle.
- Formula(e) to calculate the perimeter of a square, rectangle, triangle and circle.
- Answers being given in correct form and using the correct terminology.
- Application and use of geometric formulae in daily work situations.

Learning Outcome 2.7: Solve practical problems by using the correct formula(s) 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.

Key Learning Points

- Calculations of volume of cube, cuboid, cylinder, cone and sphere.
- Calculations of surface area of cube, cuboid, cylinder, cone and sphere.
- Answers being given in correct form and using the correct terminology.
- Application and use of geometric formulae in daily work situations.

Learning Outcome 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.

Key Learning Points

- Standard axioms of geometry.
- Standard theorems of geometry, including Pythagoras' Theorem.
- Calculations based on the application of Pythagoras' Theorem.
- Solving real life or simulated problems involving straight lines, parallel lines, angles and triangles.

Unit 3 Title Algebra

At the end of this unit, the learner will be able to:

Learning Outcome 3.1: Discuss the presence of variables in a range of real life situations.

Key Learning Points

- Understanding of what a variable is.
- Identifying and understanding common variables found in daily use.

Learning Outcome 3.2: Solve algebraic equations, including linear equations of one variable, simultaneous linear equations of two unknowns, and linear inequalities of one variable.

Key Learning Points

- Linear equations of one variable.
- Simultaneous linear equations of two unknowns.
- Linear inequalities of one variable.
- Problem solving of algebraic equations.

Learning Outcome 3.3: Solve quadratic equations using factors and the quadratic formula.

Key Learning Points

- Quadratic equations formulae.
- Solving practical problems using quadratic method.
- Solving such equations using factors.
- Recognising when to use each method.

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

Key Learning Points

- Understanding of what an equation is.
- Correct terminology.
- Practical algebraic equations in real life situations.
- Calculations involving rearranging formulae.

Unit 4 Title Data Handling

At the end of this unit, the learner will be able to:

Learning Outcome 4.1: Explain basic statistical concepts, to include population, sample, and dependent, independent and discrete variables.

Key Learning Points

- Basic statistical concepts to include population, sample, variables.
- Dependent, independent and discrete variables.
- The use of statistics in real life situations.
- Understanding data sampling.
- Basic analysis and interpretation of statistics.
- Explaining statistics, and basic analysis and interpretation.

Learning Outcome 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.

Key Learning Points

- Understanding the application of data collection techniques.
- Presentation of data in graphic form, including bar charts, pie charts, trend graphs, cumulative frequency curves, histograms and frequency tables.

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

Key Learning Points

- Data handling and collection.
- Calculation of averages.
- Measurement of dispersion of data.
- Understanding and calculating the mean, mode and median of a data set.

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

Key Learning Points

- Interpretation of survey and trial results.
- Understanding trends and targets.
- Financial costs and profits.
- Sports tables and population census data.
- Discussion of findings.

Assessment Specification

Award Title	Mathematics
Award Type	Minor
Framework Level	4
Award Code	4N1987
Credit Value	10

Assessment	Duration	Assessment Details	Weighting	Stage at which assessment takes place
PO1.1 to PO1.14	Ongoing throughout the duration of the module	Portfolio on Number has 14 exercises.	28%	At stages in the programme when tutor and learner judge the learner to be assessment-ready.
PO2.1 to PO2.14	Ongoing throughout the duration of the module	Portfolio on Geometry has 14 exercises.	28%	At stages in the programme when tutor and learner judge the learner to be assessment-ready.
PO3.1 to PO3.4	Ongoing throughout the duration of the module	Portfolio on Algebra has 4 exercises.	8%	At stages in the programme when tutor and learner judge the learner to be assessment-ready.
PO4.1 to PO4.8	Ongoing throughout the duration of the module	Portfolio on Data Handling has 8 exercises.	16%	At stages in the programme when tutor and learner judge the learner to be assessment-ready.
EX	2 hours	Examination has 10 questions.	20%	At end of course when learner is exam-ready.

EX = Examination PO = Portfolio

Award Classifications

Grades	Standards
Pass	50–64%
Merit	65–79%
Distinction	80–100%

Referred: When a learner has not achieved the minimum standards for an award the grade is recorded as **Referred**.

Note: For those learners who do not reach the required standards as specified for this assessment programme, a recommended period of five days must elapse before they can retake the assessment(s).

Suggested Learning Methodologies

- Fieldwork
- Project
- Group work
- Presentation
- Demonstration
- Skills exercises
- Tutor explanations
- Internet
- Art, photography and visual aids
- Research

Specific Module Requirements

The following is a recommended list of capital equipment. The list is not definitive as some of the items listed may not be essential in order to run the course. Items other than those listed may also be acquired for the course at the discretion of the Manager.

- Calculator
- Drawing instruments
- Internet access
- Tape measure
- Graph paper

Suggested Learning Resources

All of the curriculum resources mentioned below are available on the Moodle Community Services Curriculum and Assessment (CSCA) page. You can access the CSCA Moodle web page from this link:

<http://www.ecollege.ie/site/home.html>

The learning resources include the following:

- Learner Pack Level 4 Mathematics Unit 1: Number
- Learner Pack Level 4 Mathematics Unit 2: Geometry
- Learner Pack Level 4 Mathematics Unit 3: Algebra
- Learner Pack Level 4 Mathematics Unit 4: Data Handling
- Answers to tasks in Learner Pack
- Tutor Guide Level 4 Mathematics
- Resources Pack Level 4 Mathematics

Internet Sources

www.writeon.ie

www.literacytools.ie
<http://www.nce-mstl.ie/>

Recommended by: _____

Manager, Training Policy Development and Support

Approved by: _____

Director, Training Policy Development and Support