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Training & Employment Authority

Module Descriptor

Functional Mathematics

Award Type: Minor
Award Level: 4
Award Code: 4N2138
Validation date 10th July 2012

Revision 1.0

Module Descriptor

Purpose: The purpose of this award is to equip the learner with the knowledge, skill and competence to recognize situations where mathematics can be used meaningfully in daily life, apply and transfer mathematical processes and concepts appropriate to the situation, interpret and draw conclusions from activity, and communicate conclusions appropriately to others. It is designed to develop skills that enable more effective functioning in personal life, the workplace and as a member of society. Achievement of this award reflects ability to complete tasks and processes independently under supervision.

Module Duration: The typical learning effort required from a typical learner to successfully achieve the stated learning outcomes for the module is **50 (fifty) hours.**

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

1. Explain how mathematics can be used to enable the individual to function more effectively as a person and as a citizen.
2. Discuss the presence of variables in a range of real life situations.
3. Convert from scientific notation to standard form and standard form to scientific notation.
4. Use appropriate strategies, including estimation and percentage error, to give approximations, where numbers are from the set of natural numbers (N) and from the set of integers (Z).
5. 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.
6. 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.
7. Differentiate between simple interest and compound interest by applying the appropriate given formula to a range of savings and credit options.
8. Calculate pay slips (using appropriate statutory deductions), gross profit, net profit and loss on goods sold, and VAT inclusive and VAT exclusive prices.
9. Solve quadratic equations using factors and the quadratic formula.
10. Solve algebraic equations, including linear equations and linear inequalities of one variable, and simultaneous linear equations of two unknowns.
11. Construct algebraic expressions and formulae for real life situations using the correct terminology and including rearrangement of formulae.
12. Solve problems for a range of familiar and unfamiliar meaningful, real life situations by mathematizing the situations, making an initial model of the situation, deciding on appropriate mathematical techniques and tools to use in the situation, applying mathematical techniques, examining

patterns, relationships and assumptions, making adjustments to see their effect on the initial model, and discussing and presenting results and conclusions in relation to the situation.

13. Discuss areas where additional mathematical skills could be developed to meet personal needs to enable a more active role in a community, educational or workplace setting.

Unit 1 **Title Number**

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

1.1 Explain how mathematics can be used to enable the individual function more effectively as a person and as a citizen.

1.2 Convert from scientific notation to standard form and standard form to scientific notation.

1.3 Use appropriate strategies including 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, 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 Differentiate between simple interest and compound interest by applying the appropriate given formula to a range of savings and credit options.

1.6 Calculate pay slips using appropriate statutory deductions, gross profit, net profit and loss on goods sold, VAT inclusive and VAT exclusive prices.

Key Learning Points

Learning Outcome 1.1: Explain how mathematics can be used to enable the individual function more effectively as a person and as a citizen.
Key Learning Points
• Examples of mathematics in everyday life. • The relevance and usefulness of mathematics in everyday life. • The importance of mathematics in the world around us. • The use of mathematics in a range of contexts – for example, at home, in the workplace, and in social and civic life.

Learning Outcome 1.2: Convert from scientific notation to standard form and standard form to scientific notation.
Key Learning Points
• The concept (idea) of scientific notation. • Converting numbers from standard form to scientific notation. • Converting numbers from scientific notation to standard form.

Learning Outcome 1.3: Use appropriate strategies, including 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
• Identifying natural numbers (N) and integers (Z). • Estimating and rounding off numbers to give approximations to the nearest whole number or a certain number of decimal places. • Understanding the concept of percentage error. • Calculating percentage error.

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
• Performing addition, subtraction, multiplication and division operations on a calculator. • Using the calculator to solve problems requiring operations such as percentage, square-root, memory keys and the clear key. • Becoming familiar with and confidently using specific keys on the calculator such as the power key, pi, 1/x, scientific notation keys and the second function key.

Learning Outcome 1.5: Differentiate between simple interest and compound interest by applying the appropriate given formula to a range of savings and credit options.
Key Learning Points
• Understanding the concepts of simple interest and compound interest. • Differentiating between the two types of interest. • Calculating both types of interest using the appropriate formulas. • Applying knowledge to real life questions, including savings and credit options.

Learning Outcome 1.6: Calculate 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
• Becoming familiar with the meaning of terminology on pay slips, such as gross and net pay and deductions, and how to make such calculations. • Understanding common mathematical terms associated with buying and selling goods. • Being able to calculate using a number of real life financial examples. • Developing an understanding of what VAT is, and knowing how to calculate it and how it affects the prices of goods we buy and bills we pay. • Understanding profit and loss, and how to calculate them.

Unit 2 Title Algebra

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

2.1 Discuss the presence of variables in a range of real life situations.

2.2 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.

2.3 Solve quadratic equations using factors and the quadratic formula.

2.4 Solve algebraic equations including linear equations and linear inequalities of one variable and simultaneous linear equations of two unknowns.

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

2.6 Solve problems for a range of familiar and unfamiliar, meaningful, real life situations by mathematising the situations, making an initial model of the situation, deciding on appropriate mathematical techniques and tools to use in the situation, applying mathematical techniques, examining patterns, relationships and assumptions and making adjustments to see their effect on the initial model, discussing and presenting results and conclusions in relation to the situation.

2.7 Discuss areas where additional mathematical skills could be developed to meet personal needs to enable a more active role in a community, educational or workplace setting.

Key Learning Points

Learning Outcome 2.1: Discuss the presence of variables in a range of real life situations.
Key Learning Points
• Understanding the concept of a variable. • Recognizing the presence of variables in real life situations. • Replacing variables with values through substitution.

Learning Outcome 2.2: 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
• Understanding the laws of indices and the rules of logs. • Recognizing the links between the two. • Applying such knowledge to a number of basic examples where you convert from log to index form and vice versa. • Using the knowledge of indices and logs to simplify expressions, solve equations and transpose formulae

Learning Outcome 2.3: Solve quadratic equations using factors and the quadratic formula.
Key Learning Points
• Understanding the concept of a quadratic equation. • Solving such equations using factors (guide number method). • Solving such equations using the quadratic formula method. • Recognizing when to use each method.

Learning Outcome 2.4: Solve algebraic equations, including linear equations and linear inequalities of one variable, and simultaneous linear equations of two unknowns.
Key Learning Points
• Understanding the concepts of an equation and an inequality, and being able to differentiate between them. • Solving linear equations and inequalities of one variable. • Understanding the concept of simultaneous equations. • Solving simultaneous linear equations of two unknowns.

Learning Outcome 2.5: Construct algebraic expressions and formulae for real life situations using the correct terminology and including rearrangement of formulae.
Key Learning Points
• Constructing algebraic expressions and equations for real life situations. • Using correct terminology. • Solving word problems using formulae through rearrangement.

Learning Outcome 2.6: Solve problems for a range of familiar and unfamiliar meaningful, real life situations by mathematizing the situations, making an initial model of the situation, deciding on appropriate mathematical techniques and tools to use in the situation, applying mathematical techniques, examining patterns, relationships and assumptions, making adjustments to see their effect on the initial model, and discussing and presenting results and conclusions in relation to the situation.
Key Learning Points
• Formulating real life situations into mathematical models, making assumptions if necessary. • Solving these situations using appropriate mathematical techniques and tools. • Investigating whether the mathematical solutions found solve the real world problem. • Making adjustments to the model if necessary. • Discussing and making conclusions in relation to the situation.

Learning Outcome 2.7: Discuss areas where additional mathematical skills could be developed to meet personal needs to enable a more active role in a community, educational or workplace setting.
Key Learning Points
• Discussing where you use mathematics in your everyday life. • Knowing where the mathematics you learn is relevant or can be applied outside of an educational setting. • Recognizing how you can use more mathematics in your everyday life.

Assessment Specification

Award Title	Functional Mathematics
Award Type	Minor
Framework Level	4
Award Code	4N2138
Credit Value	5

Assessment	**Duration**	**Assessment Details**	**Weighting**	**Stage at which assessment takes place**
Assignment AS1	1 hour over a period of time specified by the assessor.	Logs**,** Indices and scientific notation.	10%	When tutor and learner judge the learner to be assessment-ready in relation to the specific LOs
Assignment AS2	1 hour over a period of time specified by the assessor.	Simple and compound interest.	10%	When tutor and learner judge the learner to be assessment-ready in relation to the specific LOs.
Assignment AS3	1½ hours over a period of time specified by the assessor.	Pay slips, deductions, profit and loss, and VAT.	10%	When tutor and learner judge the learner to be assessment-ready in relation to the specific LOs.
Assignment AS4	1 hour over a period of time specified by the assessor.	Variables and linear equations.	10%	When tutor and learner judge the learner to be assessment-ready in relation to the specific LOs.

Assignment AS5	1 hour over a period of time specified by the assessor.	The use of variables and algebraic expressions in everyday life.	10%	When tutor and learner judge the learner to be assessment-ready in relation to the specific LOs.
Assignment AS6	1 hour over a period of time specified by the assessor.	Algebraic expressions and equations for use in real life scenarios.	10%	When tutor and learner judge the learner to be assessment-ready in relation to the specific LOs.
Assignment AS7	1 hour over a period of time specified by the assessor.	Quadratic equations and simultaneous equations.	10%	When tutor and learner judge the learner to be assessment-ready in relation to the specific LOs.
Examination EX1	2 ½ hours	The five sections in the examination paper between them assess ability to recall and apply knowledge, skills and understanding in relation to all learning outcomes. The learner is required to attempt four of the five sections.	30%	Close to the end of the teaching and learning programme and when tutor and learner judge that the learner is exam-ready.

Award Classifications

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

Suggested Learning Methodologies

- activities and exercises
- real world mathematics approaches
- discussion groups
- integrating language and literacy development
- project work
- textbook study
- note-taking
- consulting Internet websites

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.

- learner access to the Internet
- a scientific calculator for each learner
- learner access to an electricity meter in the centre
- a diary or a suitably headed notebook for each learner to use for keeping a maths diary

Suggested Learning Resources

A range of textbooks and resource packs, including
Active Maths 1, Project Maths Junior Certificate Mathematics by Keating et al. ISBN 978-1-84741-928-6, published by Folens.
Basic Mathematics Through Applications by Geoffrey Akst and Sadie Bragg, published by Pearson.
How to use a Calculator, ISBN 1-86311-1557 published by Prim-Ed.
Work Out Numeracy by Ted Penketh ISBN 0-333-66270-9, published by Macmillan.

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 Functional Mathematics Unit 1
- Learner Pack Level 4 Functional Mathematics Unit 2
- Answers to tasks in Learner Packs
- Tutor Guide Level 4 Functional Mathematics

- Resources Pack Level 4 Functional Mathematics

Websites

www.nce-mstl.ie/
www.writeon.ie
www.nrich.maths.org/public/
www.khanacademy.org/
www.mathsisfun.com
www.mathpower.com
www.bbc.co.uk/skillswise
www.skoool.ie
www.literacytools.ie

Recommended by: _____
Manager, Training Policy Development and Support

Approved by: _____
Director, Training Policy Development and Support