

Open University of Mauritius
Foundation Course
Foundation Level Mathematics-OUfc012

1. Introduction

In line with its philosophy to democratise access to university education, the Open University of Mauritius offers Foundation Courses. These courses aim at better preparing learners for higher education while allowing them to meet the minimum requirements to undertake undergraduate studies. They have been carefully developed by a team of experts to ensure smooth transition to university. They also motivate learners and give them a greater chance of succeeding. They play a pivotal role in helping learners to revisit lost skills, while giving them the necessary confidence and preparatory experience they need for success at university. However, they are not intended to replace secondary school courses. On successfully completing four foundation courses (8 modules) including English through Open Distance Learning (ODL), they can join degree programmes.

The ODL mode of delivery enables convenient self-study within a flexible framework. This mode of delivery allows learners to learn at their own pace, in their own place and time without disrupting their social, professional and domestic commitments hence, allowing them to earn while learning.

2. Aim

The aim of this foundation course is to provide learners with a basic knowledge and understanding of Mathematics. It is in two parts. The first part pertains to Pure Mathematics and the second part deals with Statistics.

3. Course requirements

- SC/GCE O-level with 3 credits + 1 A-level
(Applicants should be less than 25 years of age)
- Mature candidates will be considered on their own merit.

4. Course Duration

Minimum: 1 year
Maximum: 2 years

5. Minimum credits required for the awards

8 credits

Each credit in the University's system is equivalent to a minimum of 20 hours of study including all learning activities (i.e. reading and comprehending the print material, listening to audio, watching video, attending tutorials/counseling sessions, writing assignment responses and preparation for the examinations). Thus, this 8- credit course involves a minimum of 160 hours of study.

6. Assessment

- Assignments 30%
- Examinations 70%
- Overall pass 40%

Assessments will be based on written examination of 2-hour duration and continuous assessment carrying a maximum of 30% of total marks. Continuous assessment will be based on assignment(s). For a learner to pass a module, an overall total of 40% for combined continuous assessment and written examination components would be required without minimum thresholds within the individual continuous assessment and written examination. Learners may re-sit up to a maximum of two failed modules for the semester of the programme.

7. Course structure

MODULE CODE	MODULE	Semester 1	Semester 2	Number of Credits
OUfc012111	Foundation in Mathematics I	√		4
OUfc012121	Foundation in Mathematics II		√	4

8.

9. Module Outline

OUfc012111-Foundation in Mathematics I:

Unit 1: Working with numbers

Unit objective & learning outcomes

One of the fundamental components of Mathematics is numbers. This unit aims at revisiting the rules related to manipulation of numbers.

On completion of this unit, learners should be able to:

- use natural numbers, integers, fractions, prime numbers, common factors and common multiples, real numbers;
- use the language and notation of simple vulgar and decimal fractions and percentages; recognise equivalence and convert between these forms;
- use the four operations for calculations with whole numbers, decimal fractions and vulgar (and mixed) fractions, including correct ordering of operations and use of brackets;
- calculate squares, square roots, cubes and cube roots of numbers;
- use directed numbers;
- use notation of ratio;
- use percentages;
- recognise and use arithmetic and geometric progressions;
- use a calculator.

Unit 2: Algebra

Unit objective & learning outcomes:

This unit introduces Algebra which allows learners to manipulate variables and functions.

On completion of this unit, learners should be able to:

- use brackets and extract common factors;
- expand products of algebraic expressions;
- factorise expressions;
- manipulate simple algebraic fractions;
- solve simple linear equations in one unknown;
- solve quadratic equations by factorisation and by use of the formula;
- solve simultaneous equations in two unknowns;
- solve inequalities;
- understand the terms: function, domain, range, one-one function, inverse function and composition of functions;
- know and use the remainder and factor theorems; and
- know and use the laws of logarithms.

Unit 3: Trigonometry

Unit objective & learning outcomes:

This unit introduces the fundamental concepts of trigonometry.

On completion of this unit, learners should be able to:

- apply Pythagoras Theorem and the sine, cosine and tangent ratios for acute angles to the calculation of a side or of an angle of a right-angled triangle;
- know the six trigonometric functions of angles of any magnitude (sine, cosine, tangent, secant, cosecant, cotangent);
- use sine and cosine rule;
- prove simple trigonometric identities; and
- use and draw graphs of trigonometric functions.

Unit 4: Calculus

Unit objective & learning outcomes:

This unit focuses on the concepts of differentiation and integration and their applications.

On completion of this unit, learners should be able to:

- understand the idea of a derived function;
- use the derivatives of the standard functions x^n (for any rational n), $\sin x$, $\cos x$, $\tan x$, e^x , $\ln x$, together with constant multiples, sums and composite functions of these;
- differentiate products and quotients of functions;
- apply differentiation to stationary points, connected rates of change, small increments and approximations and practical maxima and minima problems;
- discriminate between maxima and minima by any method;
- understand integration as the reverse process of differentiation;
- integrate simple functions; and
- evaluate definite integrals and apply integration to the evaluation of plane areas.

OUfc012121-Foundation in Mathematics II:

Unit 5: Permutation and Combination

Unit objective & learning outcomes:

Very often we have to determine the number of possible ways that we have to complete a task. This unit focuses on the techniques of permutation and combinations.

On completion of this unit, learners should be able to:

- understand the terms permutation and combination, and solve simple problems involving selections; and
- solve problems about arrangements of objects in a line.

Unit 6: Data Representation and Analysis

Unit objective & learning outcomes:

This unit focuses on techniques of representing data as well as analyzing them.

On completion of this unit, learners should be able to:

- select a suitable way of presenting raw statistical data;
- construct and interpret pie and bar charts, stem-and-leaf diagrams, box-and-whisker plots, and histograms;
- understand and use different measures of central tendency (mean, median, mode) and variation (range, interquartile range, standard deviation), e.g. in comparing and contrasting sets of data;
- use a cumulative frequency graph to estimate the median value, the quartiles and the interquartile range of a set of data; and
- calculate the mean and standard deviation of a set of data (including grouped data).

Unit 7: Correlation and Regression

Unit objective & learning outcomes:

This unit allows learner to enter the world of data modeling. Finding relationships between variables and building simple linear regression models.

On completion of this unit, learners should be able to:

- understand the concept of correlation and use correlation coefficients; and
- understand regression and write simple regression models.

Unit 8: Probability

Unit objective & learning outcomes:

This unit introduces the basic concepts of probability.

On completion of this unit, learners should be able to:

- evaluate probabilities in simple cases and use tree diagram;
- construct a probability distribution table relating to a given situation involving a discrete random variable X , and calculate $E(X)$ and $\text{Var}(X)$;
- use formulae for probabilities for the binomial distribution, and recognise practical situations where the binomial distribution is a suitable model;

- calculate probabilities for the Poisson distribution $Po(\mu)$; and
- understand the use of a normal distribution to model a continuous random variable, and use normal distribution tables.

9. Supporting Materials

Supporting Materials	
Manual	Open University of Mauritius
Video	
References	<ul style="list-style-type: none">•

