1. **Title of the module**

MAST3003 (MA363) - Foundation Mathematics 2

1. **School or partner institution which will be responsible for management of the module**

School of Mathematics, Statistics and Actuarial Science

1. **The level of the module (Level 4, Level 5, Level 6 or Level 7)**

Level 3

1. **The number of credits and the ECTS value which the module represents**

15 credits (7.5 ECTS)

1. **Which term(s) the module is to be taught in (or other teaching pattern)**

Spring

1. **Prerequisite and co-requisite modules**

Pre-requisite: None

Co-requisite: MAST3001 (Foundation Mathematics 1)

1. **The programmes of study to which the module contributes**

BSc Mathematics with a Foundation Year, BSc Actuarial Science with a Foundation Year, BSc Data Science with a Foundation Year.

1. **The intended subject specific learning outcomes.  
   On successfully completing the module students will be able to:**

8.1 demonstrate understanding of the basic body of knowledge associated with standard functions and their graphical interpretation;

8.2 demonstrate the capability to solve problems in accordance with the basic theories and concepts of the numerical and analytical integration of functions of a single variable, whilst demonstrating a reasonable level of skill in calculation and manipulation of the material;

8.3 apply the basic techniques associated with integration in several well-defined contexts;

8.4 demonstrate a mathematical proficiency suitable for stage 1 entry.

1. **The intended generic learning outcomes.  
   On successfully completing the module students will be able to:**

9.1 manage their own learning and make use of appropriate resources;

9.2 understand logical arguments, identifying the assumptions made and the conclusions drawn;

9.3 communicate straightforward arguments and conclusions reasonably accurately and clearly;

9.4 manage their time and use their organisational skills to plan and implement efficient and effective modes of working;

9.5 solve problems relating to qualitative and quantitative information;

9.6 make use of information technology skills such as online resources (Moodle), internet communication;

9.7 demonstrate skill in numeracy and computation.

1. **A synopsis of the curriculum**

This module introduces the ideas of integration and numerical methods.

a) Integration: Integration as a limit of a sum and graphical principles of integration, derivatives, anti-derivatives and the Fundamental Theorem of Calculus (without proof), definite and indefinite integrals, integration of simple functions.

b) Methods of integration: integration by parts, integration by change of variables and by substitution, integration by partial fractions.

c) Solving first order ordinary differential equations: separable and linear first order ordinary differential equations, construction of differential equations in context, applications of differential equations and interpretation of solutions of differential equations.

d) Numerical integration: mid-ordinate rule, trapezium rule, Simpson’s rule.

Additional material may include root finding using iterative methods, parametric integration, surfaces and volumes of revolution.

1. **Reading list (Indicative list, current at time of publication. Reading lists will be published annually)**

Core Maths for Advanced Level, L Bostock and S Chandler, Nelson Thornes Ltd, 2013.

Calculus of One Variable, K.E.Hirst, Springer-Verlag (2006) (available through SpringerLink)

An Introduction to Modern Mathematical Computing, J. Borwein and M. Skerritt, Springer (2011).

1. **Learning and teaching methods**

Total contact hours: 44

Private study hours: 106

Total study hours: 150

1. **Assessment methods**
   1. Main assessment methods

Assessment 1 Exercises, taking on average between 10 and 15 hours to complete 10%

Assessment 2 Exercises, taking on average between 10 and 15 hours to complete 10%

Examination 2 hours 80%

The coursework mark alone will not be sufficient to demonstrate the student’s level of achievement on the module.

13.2 Reassessment methods

Like-for-like

1. **Map of module learning outcomes (sections 8 & 9) to learning and teaching methods (section12) and methods of assessment (section 13)**

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Module learning outcome** | 8.1 | 8.2 | 8.3 | 8.4 | 9.1 | 9.2 | 9.3 | 9.4 | 9.5 | 9.6 | 9.7 |
| **Learning/ teaching method** |  |  |  |  |  |  |  |  |  |  |  |
| Private Study and Assessment | **x** | **x** | **x** | **x** | **x** | **x** | **x** | **x** | **x** | **x** | **x** |
| Lectures/exercise classes | **x** | **x** | **x** | **x** |  | **x** | **x** |  | **x** |  | **x** |
| Revision classes | **x** | **x** | **x** | **x** |  | **x** | **x** |  | **x** |  | **x** |
| **Assessment method** |  |  |  |  |  |  |  |  |  |  |  |
| Examination | **x** | **x** | **x** | **x** | **x** | **x** | **x** | **x** | **x** |  | **x** |
| Coursework | **x** | **x** | **x** | **x** | **x** | **x** | **x** | **x** | **x** | **x** | **x** |

1. **Inclusive module design**

The School recognises and has embedded the expectations of current equality legislation, by ensuring that the module is as accessible as possible by design. Additional alternative arrangements for students with Inclusive Learning Plans (ILPs)/declared disabilities will be made on an individual basis, in consultation with the relevant policies and support services.

The inclusive practices in the guidance (see Annex B Appendix A) have been considered in order to support all students in the following areas:

a) Accessible resources and curriculum

b) Learning, teaching and assessment methods

1. **Campus(es) or centre(s) where module will be delivered**

Canterbury

1. **Internationalisation**

Mathematics is an international language with techniques developed and refined by mathematicians across the globe. Mastery of the subject-specific learning outcomes, 8.1 to 8.3, will equip students to apply the theories and techniques of this module in a wide range of international contexts. The module team is drawn from the School of Mathematics, Statistics and Actuarial Science, which includes many members of staff with international experience of teaching and research collaboration.

In compiling the reading list, consideration has been given to the range of texts that are available internationally and a selection of texts has been identified to complement the delivery of the material.

The support SMSAS provides to its students is also internationally attuned given our international student body.

**DIVISIONAL OFFICE USE ONLY**

**Revision record – all revisions must be recorded in the grid and full details of the change retained in the appropriate committee records.**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Date approved | Major/minor revision | Start date of the delivery of revised version | Section revised | Impacts PLOs (Q6&7 cover sheet) |
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