University of the West of Scotland
Module Descriptor

Session: 2022/23

Title of Module: Introductory Mathematics B			
Code: MATH06002	**SCQF Level: 6 (Scottish Credit and Qualifications Framework)**	**Credit Points: 10**	**ECTS: (European Credit Transfer Scheme)**
School:	School of Computing, Engineering and Physical Sciences		
Module Co-ordinator:	Ryan P. Meeten		

Summary of Module

This module is designed to follow on from **Introductory Mathematics A**, although this is not a mandatory prerequisite.

The purpose of this module is to provide students with a solid understanding of elementary differential and integral calculus at the level an incoming university STEM student.

The module will begin by discussing the key concept of a limit. This allows the construction of the notion of an “instantaneous rate of change”, from which the derivative emerges. After introducing the derivative, students will learn how to differentiate some of the elementary functions discussed in **Introductory Mathematics A.** Some important applications of derivatives, such as optimisation and constructing tangent lines will be considered, and important techniques of differentiation, such as the chain rule, will be shown.

The second part of this module will take up the topic of integral calculus. This is the study of areas and volumes. It is a remarkable fact that integration and differentiation are inverse processes, a result known as the *Fundamental Theorem of Calculus,* which will be proved in class. After learning about both definite and indefinite integrals, the module will end by exploring some techniques of integration, such as the method of integration by substitution.

Module Delivery Method

Face-To-Face	**Blended**	**Fully Online**	**HybridC**	**HybridO**	**Work-based Learning**
	✔				

Face-To-Face
Term used to describe the traditional classroom environment where the students and the lecturer meet synchronously in the same room for the whole provision.

Blended
A mode of delivery of a module or a programme that involves online and face-to-face delivery of learning, teaching and assessment activities, student support and feedback. A programme may be considered “blended” if it includes a combination of face-to-face, online and blended modules. If an online programme has any compulsory face-to-face and campus elements it must be described as blended with clearly articulated delivery information to manage student expectations
Fully Online
Instruction that is solely delivered by web-based or internet-based technologies. This term is used to describe the previously used terms distance learning and e learning.
HybridC
Online with mandatory face-to-face learning on Campus
HybridO
Online with optional face-to-face learning on Campus
Work-based Learning
Learning activities where the main location for the learning experience is in the workplace.

Campus(es) for Module Delivery						
The module will **normally** be offered on the following campuses / or by Distance/Online Learning: (Provided viable student numbers permit)						
Paisley:	Ayr:	Dumfries:	Lanarkshire:	London:	Distance/Online Learning:	Other:
✔						

Term(s) for Module Delivery					
(Provided viable student numbers permit).					
Term 1		Term 2		Term 3	✔

Learning Outcomes: (maximum of 5 statements)
On successful completion of this module the student will be able to: **L1**. Appreciate and use the concept of a limit **L2**. Understand and apply the definition of the derivative **L3**. Differentiate elementary functions and combinations thereof **L4**. State and apply the Fundamental Theorem of Calculus to find areas under curves **L5**. Integrate standard elementary functions

Employability Skills and Personal Development Planning (PDP) Skills	
SCQF Headings	During completion of this module, there will be an opportunity to achieve core skills in:

Knowledge and Understanding (K and U)	SCQF Level 6 Students will obtain essential foundational knowledge in calculus for studying science, technology, engineering, mathematics and other technical disciplines at university level.	
Practice: Applied Knowledge and Understanding	SCQF Level 6 The key concepts of differential and integral calculus will be discussed, including the most important applications. These will be contextualised with reference to physics, chemistry and financial applications.	
Generic Cognitive skills	SCQF Level 6 Students will enhance their numeracy and logic abilities, as well as their overall preparedness for university study.	
Communication, ICT and Numeracy Skills	SCQF Level 6 Collaborative group working at the whiteboard during tutorial sessions will be encouraged. Peer teaching will happen naturally during these interactions. Students will also be shown the GeoGebra software for graphing and manipulating geometric objects.	
Autonomy, Accountability and Working with others	SCQF Level 6 Those choosing to attend this summer school module will have already displayed ownership of their own learning. These qualities will be further developed, with students being encouraged to identify and address their own knowledge gaps, thereby solidifying their mathematical foundations in preparation for future study. The importance of academic honesty will be instilled throughout the module.	
Pre-requisites:	Before undertaking this module the student should have undertaken the following:	
	Module Code:	**Module Title: N/A**
	Other:	**Introductory Mathematics A** Encouraged but not required.
Co-requisites	**Module Code:**	**Module Title: N/A**

* Indicates that module descriptor is not published.

Learning and Teaching	
Learning Activities During completion of this module, the learning activities undertaken to achieve the module learning outcomes are stated below:	**Student Learning Hours** (Normally totalling 200 hours): (Note: Learning hours include both contact hours and hours spent on other learning activities)
Lecture/Core Content Delivery	9
Tutorial/Synchronous Support Activity	9
Laboratory/Practical Demonstration/Workshop	
Independent Study	12

**Indicative Resources: (eg. Core text, journals, internet access)
The following materials form essential underpinning for the module content and ultimately for the learning outcomes: Module materials will be sufficient and self-contained, however any textbook in introductory level university mathematics will contain all topics in this module. We will make use of the free resource openstax Calculus (Volume 1).
(**N.B. Although reading lists should include current publications, students are advised (particularly for material marked with an asterisk*) to wait until the start of session for confirmation of the most up-to-date material)

Engagement Requirements
In line with the Academic Engagement Procedure, Students are defined as academically engaged if they are regularly engaged with timetabled teaching sessions, course-related learning resources including those in the Library and on the relevant learning platform, and complete assessments and submit these on time. Please refer to the Academic Engagement Procedure at the following link: Academic engagement procedure

Supplemental Information

Programme Board	CEPS School Board
Assessment Results (Pass/Fail)	No – graded
Subject Panel	Physical Sciences
Moderator	Raymond Carragher
External Examiner	Paul Wilson
Accreditation Details	**N/A**
Changes/Version Number	V 1.0

Assessment: (also refer to Assessment Outcomes Grids below)
Open book individual class test (online) (100%)
(N.B. **Assessment Outcomes Grids** for the module (one for each component) can be found below which clearly demonstrate how the learning outcomes of the module will be assessed.

Assessment Outcome Grids (Footnote A.)

Component 1

Assessment Type (Footnote B.)	Learning Outcome (1)	Learning Outcome (2)	Learning Outcome (3)	Learning Outcome (4)	Learning Outcome (5)	Weighting (%) of Assessment Element	Timetabled Contact Hours
Class Test	✔	✔	✔	✔	✔	100	3
Combined Total For All Components						100%	3

Footnotes
A. Referred to within Assessment Section above
B. Identified in the Learning Outcome Section above

Note(s):

1. More than one assessment method can be used to assess individual learning outcomes.
2. Schools are responsible for determining student contact hours. Please refer to University Policy on contact hours (extract contained within section 10 of the Module Descriptor guidance note).
   This will normally be variable across Schools, dependent on Programmes &/or Professional requirements.

Equality and Diversity
The module is suitable for any student satisfying the pre-requisites. UWS Equality and Diversity Policy
(N.B. Every effort will be made by the University to accommodate any equality and diversity issues brought to the attention of the School)