University of the West of Scotland
Module Descriptor

Session: 2023/24

Title of Module: Differential Equations 1			
Code: MATH08002	SCQF Level: 8 (Scottish Credit and Qualifications Framework)	Credit Points: 20	ECTS: 10 (European Credit Transfer Scheme)
School:	School of Computing, Engineering and Physical Sciences		
Module Co-ordinator:	Alan J Walker		
Summary of Module			
This module provides an introduction to differential equations. First and higher order ordinary differential equations are studied. A range of solution methods that do not rely on integration are covered, including, but not restricted to, using Laplace transforms, undetermined coefficients, superposition, and characteristic equations. A similar range of solution methods involving integration are covered, including, but not restricted to, separation of variables, use of integrating factors, substitutions and variation of parameters. Some applications of differential equations are considered, such as radioactive decay, Newton's Law of Cooling, motion in a gravitational field, and mechanical vibrations, including simple harmonic motion, undamped vibrations, damped vibrations and forced vibrations. Bespoke mathematical software will be used to study problems in non-routine contexts. The Graduate Attributes relevant to this module are given below: • Academic: Critical thinker; Analytical; Inquiring; Knowledgeable; Problem-solver; Digitally literate; Autonomous. • Personal: Motivated; Resilient • Professional: Ambitious; Driven.			

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. Use integration methods to solve ordinary differential equations.
L2. Solve linear, higher order differential equations using the method of undetermined coefficients.
L3. Use Laplace Transforms to solve ordinary differential equations.
L4. Use mathematical software to produice and analyse the solution of ordinary differential equations

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 8. Broad knowledge of analytic and numerical methods for the solution of differential equations. Ability to demonstrate awareness of the application of differential equations in engineering and science.
Practice: Applied Knowledge and Understanding	SCQF Level 8. Select and apply a range of routine techniques to obtain solutions to differential equations. Ability to apply a range of methods to carry out investigations in engineering and science.

Generic Cognitive skills	SCQF Level 8. Presenting mathematical arguments based on critical analysis such as calculations and solutions to practical problems in routine contexts. Explaining mathematical reasoning and calculation in a basic way.
Communication, ICT and Numeracy Skills	SCQF Level 8. Use a wide range of routine skills and some advanced and specialised skills associated with differential equations to convey complex information to a range of audiences and for a range of purposes. These skills will include the use of suitable mathematical software.

Autonomy, Accountability and Working with others	SCQF Level 8. Working in a small group to solve mathematical problems. Identifying and addressing their own learning needs and obtaining help from academic staff, both during and outside class time.	
Pre-requisites:	Before undertaking this module the student should have undertaken the following:	
	Module Code: MATH07003	**Module Title:** Calculus A
	Other:	or equivalent
Co-requisites	**Module Code:**	**Module Title:**

* Indicates that module descriptor is not published.

Learning and Teaching	
Subject matter is rehearsed systematically in formal lectures. Practical experience is provided by tutorial sessions based on questions and exercises for students to attempt.	
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	36
Tutorial/Synchronous Support Activity	12
Independent Study	152
	200 Hours Total
**Indicative Resources: (eg. Core text, journals, internet access)	
The following materials form essential underpinning for the module content and ultimately for the learning outcomes: "Differential Equations" class notes as published on the University VLE. "Engineering Mathematics", KA Stroud Suitable bespoke mathematical software	

(**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	Physical Sciences
Assessment Results (Pass/Fail)	No
Subject Panel	Physical Sciences
Moderator	Dr Kenneth C Nisbet
External Examiner	C Macdonald
Accreditation Details	
Changes/Version Number	2.13 Changes to module summary to include computing aspect followed up by changes under Learning and Teaching. Extra learning outcome added. Name changed to "Differential Equations 1" because it is now part of a sequence Changed delivery mode to "face-to-face" for new AY

Assessment: (also refer to Assessment Outcomes Grids below)
Unseeen Adapted Assessment (50%)
Coursework Assignment involving a series of tasks (50%)
(N.B. (i) **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. (ii) An **indicative schedule** listing approximate times within the academic calendar when assessment is likely to feature will be provided within the Student Handbook.)

Assessment Outcome Grids (Footnote A.)

Component 1

Assessment Type (Footnote B.)	Learning Outcome (1)	Learning Outcome (2)	Learning Outcome (3)	Learning Outcome (4)	Weighting (%) of Assessment Element	Timetabled Contact Hours
Unseen closed book (standard)	✓	✓	✓		50	2

Component 2

Assessment Type (Footnote B.)	Learning Outcome (1)	Learning Outcome (2)	Learning Outcome (3)	Learning Outcome (4)	Weighting (%) of Assessment Element	Timetabled Contact Hours
Class test (practical)	✓	✓		✓	50	5

Combined Total For All Components	100%	7 hours

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)