

University of the West of Scotland

Module Descriptor

Session: 2024/25

Title of Module: Partial Differential Equations			
Code: MATH10003	SCQF Level: 10 (Scottish Credit and Qualifications Framework)	Credit Points: 20	ECTS: 10 (European Credit Transfer Scheme)
School:	School of Computing, Engineering & Physical Sciences		
Module Co-ordinator:	Dr Kenneth Nisbet		
Summary of Module			
<p>The module covers the solution of first and second order partial differential equations, and their application in commonly occurring problems in science and engineering.</p> <p>For first order equations, the use of direct integration, separation of variables, Laplace transforms and the method of characteristics as methods of solution are studied, with application in problems involving, for example, advection processes.</p> <p>For second order equations, the focus of the study is on the main analytic method of solution, i.e. separation of variables. The theory of Fourier series is revisited in this context. Applications to problems involving such as conduction, diffusion and wave propagation are discussed.</p> <p>In addition to these analytic processes, numerical methods of solution, such as finite difference methods, are discussed together with application in problems such as advection processes. Suitable software is used.</p> <p>The Graduate Attributes relevant to this module are given below:</p> <ul style="list-style-type: none"> • Academic: Critical thinker; Analytical; Inquiring; Knowledgeable; Problem-solver; Digitally literate; Autonomous. • Personal: Motivated, Creative; Resilient. • Professional: Research-minded; Ambitious; Driven. 			

Module Delivery Method					
Face-To-Face	Blended	Fully Online	HybridC	Hybrid 0	Work-Based Learning
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
See Guidance Note for details.					

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) (tick as appropriate)						
Paisley:	Ayr:	Dumfries:	Lanarkshire:	London:	Distance/Online Learning:	Other:
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Add name

Term(s) for Module Delivery					
(Provided viable student numbers permit).					
Term 1	<input type="checkbox"/>	Term 2	<input checked="" type="checkbox"/>	Term 3	<input type="checkbox"/>

Learning Outcomes: (maximum of 5 statements) These should take cognisance of the SCQF level descriptors and be at the appropriate level for the module. At the end of this module the student will be able to:	
L1	Demonstrate detailed knowledge and understanding of analytic solution methods for first order partial differential equations.
L2	Demonstrate detailed knowledge and understanding of analytic solution methods for second order partial differential equations.
L3	Use a range of techniques in the solution Implement mathematical software to solve partial differential equations in applications, and to interpret the solutions.
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 10 Demonstrating a detailed knowledge and understanding of important techniques used in solving partial differential equations. Demonstrating critical awareness of established techniques of enquiry in common applications of partial differential equations.
Practice: Applied Knowledge and Understanding	SCQF Level 10 Using a range of standard techniques to solve problems at advanced levels, and sometimes in non-routine contexts. Conducting defined investigative problems within a mathematically based subject.
Generic Cognitive skills	SCQF Level 10 Conceptualising and analysing problems informed by professional and research issues.

Communication, ICT and Numeracy Skills	SCQF Level 10 Implementing and interpreting the output from suitable mathematical software. Making formal written presentation(s) based on the output from an investigative problem.	
Autonomy, Accountability and Working with others	SCQF Level 10 Exercising independence and initiative in conducting complex activities. Identifying learning needs through reflection based on self, tutor, and peer evaluation of work.	
Pre-requisites:	Before undertaking this module, the student should have undertaken the following:	
	Module Code: MATH09002	Module Title: Differential Equations 2
	Other:	or equivalent
Co-requisites	Module Code:	Module Title:

*Indicates that module descriptor is not published.

Learning and Teaching	
In line with current learning and teaching principles, a 20-credit module includes 200 learning hours, normally including a minimum of 36 contact hours and maximum of 48 contact hours.	
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	24
Tutorial/Synchronous Support Activity	12
Laboratory/Practical Demonstration/Workshop	12
Independent Study	152
	Hours Total 200
**Indicative Resources: (e.g. Core text, journals, internet access)	

The following materials form essential underpinning for the module content and ultimately for the learning outcomes:

"Partial Differential Equations" class notes as published on the University VLE. Suitable bespoke mathematical software.

"Applied Partial Differential Equations", J Ockendon.

Please ensure the list is kept short and current. Essential resources should be included, broader resources should be kept for module handbooks / Aula VLE.

Resources should be listed in Right Harvard referencing style or agreed professional body deviation and in alphabetical order.

(*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)

Attendance and Engagement Requirements

In line with the [Student Attendance and Engagement Procedure](#): Students are academically engaged if they are regularly attending and participating in timetabled on-campus and online teaching sessions, asynchronous online learning activities, course-related learning resources, and complete assessments and submit these on time.

Equality and Diversity

The University's Equality, Diversity and Human Rights Procedure can be accessed at the following link: [UWS Equality, Diversity and Human Rights Code](#).

Please ensure any specific requirements are detailed in this section. Module Co-ordinators should consider the accessibility of their module for groups with protected characteristics..

(N.B. Every effort will be made by the University to accommodate any equality and diversity issues brought to the attention of the School)

Supplemental Information

Divisional Programme Board	Engineering & Physical Sciences
Assessment Results (Pass/Fail)	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
School Assessment Board	Computing, Engineering & Physical Sciences
Moderator	Dr Alan Walker

External Examiner	C Guiver
Accreditation Details	
Changes/Version Number	1.08. Changes to Module Moderator. Minor changes in wording in Employability Skills etc. and Indicative Resources sections. Change to Term 2.

Assessment: (also refer to Assessment Outcomes Grids below)
The module is assessed by a coursework exercise which includes the use of mathematical software, forming one component, and one final unseen exercise forming a second component.
Assessment 1: Adapted Assessment (Unseen, open book) (80%)
Assessment 2: An individual coursework assignment (20%)
(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 Module Handbook.)

Assessment Outcome Grids (See Guidance Note)

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
Adapted Assessment (unseen, open book)	√	√				80%	2

Component 2							
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
Coursework Assignment			√			20%	2

Combined Total for All Components						100%	4 hours
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