

## University of the West of Scotland

### Module Descriptor

**Session: 2023/24**

Last modified: 16/02/2024 09:35:00

Status: Proposal

<b>Title of Module: Mathematics for Design</b>			
<b>Code: MATH08001</b>	<b>SCQF Level: 8 (Scottish Credit and Qualifications Framework)</b>	<b>Credit Points: 20</b>	<b>ECTS: 10 (European Credit Transfer Scheme)</b>
<b>School:</b>	School of Computing, Engineering and Physical Sciences		
<b>Module Co-ordinator:</b>	Nikon Kurnosov		
<b>Summary of Module</b>			
<p>This module extends the Algebra and Calculus studied in First Year.</p> <p>The content includes:</p> <p>3D Geometry: lines and planes</p> <p>Multivariable Calculus: partial differentiation and applications, double integration</p> <p>Differential Equations: up to second order, first order systems (eigenvalues/eigenvectors).</p> <p>Examples and exercises test the basic concepts and show the applications of this material in engineering contexts.</p> <p>The Graduate Attributes relevant to this module are given below:</p> <ul style="list-style-type: none"> <li>• Academic: Critical thinker; Analytical; Inquiring; Knowledgeable; Problem-solver; Autonomous.</li> <li>• Personal: Motivated; Resilient</li> <li>• Professional: Ambitious; Driven.</li> </ul>			

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

<b>Campus(es) for Module Delivery</b>
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The module will <b>normally</b> 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 checked="" type="checkbox"/>	Term 2	<input 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	Calculate, determine and state solutions to mathematical problems arising in three dimensions.
L2	Apply basic techniques in partial differentiation in routine and non-routine contexts.
L3	Apply basic techniques in multiple integration in routine and non-routine contexts.
L4	Use standard methods to solve differential equations up to second order.

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)	<p><b>SCQF Level 8</b> Knowledge of the geometry of lines and planes in three dimensions, multivariable calculus and standard differential equations.</p> <p>An ability to demonstrate awareness of the applicability of mathematics to the solution of problems in engineering</p>
Practice: Applied Knowledge and Understanding	<p><b>SCQF Level 8</b> An ability to perform calculations correctly, for each of the above, in routine contexts.</p> <p>An ability to apply a range of methods in mathematics to carry out investigations in engineering.</p>
Generic Cognitive skills	<p><b>SCQF Level 8</b> Presenting mathematical arguments, such as calculations and solutions to practical examples.</p> <p>An ability to make some critical evaluation of the solution to a mathematical problem.</p>

Communication, ICT and Numeracy Skills	<b>SCQF Level 8</b> Ability to synthesise and communicate the results of a range of mathematical processes.	
Autonomy, Accountability and Working with others	<b>SCQF Level 8</b> An ability to autonomously construct a solution to a mathematical problem.  Identifying and addressing learning needs both during and outside class time.	
<b>Pre-requisites:</b>	Before undertaking this module the student should have undertaken the following:	
	<b>Module Code:</b>	<b>Module Title:</b>
	<b>Other:</b>	Calculus A (MATH07003), Engineering Mathematics 2, or suitable equivalent.
<b>Co-requisites</b>	<b>Module Code:</b>	<b>Module Title:</b>

\*Indicates that module descriptor is not published.

<b>Learning and Teaching</b>	
<b>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.</b>	
<b>Learning Activities</b> During completion of this module, the learning activities undertaken to achieve the module learning outcomes are stated below:	<b>Student Learning Hours</b> (Normally totalling 200 hours): (Note: Learning hours include both contact hours and hours spent on other learning activities)
Lecture/Core Content Delivery	18
Tutorial/Synchronous Support Activity	18
Independent Study	164
	200 Hours Total
<b>**Indicative Resources: (eg. Core text, journals, internet access)</b>	

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

"Mathematics for Design" class notes as published on the University VLE.

"Calculus: One and Several Variables", SL Salas, GJ Etgen & E Hille.

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.

For the purposes of this module, academic engagement equates to the following:

Attendance at the lectures and tutorial sessions  
 Attempting problems during the tutorial session  
 Completion of the coursework assessments  
 Studying for and completion of the examination

### 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](#).

(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

<b>Divisional Programme Board</b>	Engineering and Physical Sciences
<b>Assessment Results (Pass/Fail)</b>	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
<b>School Assessment Board</b>	Physical Sciences

<b>Moderator</b>	Kwok Chi Chim
<b>External Examiner</b>	C Guiver
<b>Accreditation Details</b>	This module is part of the MSc Chemical Engineering programme accredited by the IChemE, accredited by Joint Board of Moderators of the ICE, IStructE, IHE and CIHT as part of BEng (Hons) Civil Engineering, and by IMechE as part of BEng(Hons) Mechanical Engineering.
<b>Changes/Version Number</b>	2.14

<b>Assessment: (also refer to Assessment Outcomes Grids below)</b>
<p>This section should make transparent what assessment categories form part of this module (stating what % contributes to the final mark). Maximum of 3 main assessment categories can be identified (which may comprise smaller elements of assessment). <b>NB: The 30% aggregate regulation (Reg. 3.9) (40% for PG) for each main category must be taken into account. When using PSMD, if all assessments are recorded in the one box, only one assessment grid will show and the 30% (40% at PG) aggregate regulation will not stand. For the aggregate regulation to stand, each component of assessment must be captured in a separate box.</b> Please provide brief information about the overall approach to assessment that is taken within the module. In order to be flexible with assessment delivery, be brief, but do state assessment type (e.g. written assignment rather than “essay” / presentation, etc ) and keep the detail for the module handbook. <a href="#">Click or tap here to enter text.</a></p>
Assessment 1 – Coursework (50%): a series of assignment-style tasks
Assessment 2 – Examination (50%): a formal, closed book assessment
<p>(N.B. (i) <b>Assessment Outcomes Grids</b> 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 <b>indicative schedule</b> listing approximate times within the academic calendar when assessment is likely to feature will be provided within the Student Module Handbook.)</p>

**Assessment Outcome Grids (See Guidance Note)**

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

<b>Component 2</b>						
<b>Assessment Type (Footnote B.)</b>	<b>Learning Outcome (1)</b>	<b>Learning Outcome (2)</b>	<b>Learning Outcome (3)</b>	<b>Learning Outcome (4)</b>	<b>Weighting (%) of Assessment Element</b>	<b>Timetabled Contact Hours</b>
Unseen closed book (standard)	✓	✓	✓	✓	50	2
<b>Combined Total for All Components</b>					<b>100%</b>	<b>5 hours</b>

**Change Control:**

<b>What</b>	<b>When</b>	<b>Who</b>
Updated to reflect correct staff involved in the 23-24 delivery.	16/02/2024	R. Meeten

**Version Number: MD Template 1 (2023-24)**