University of the West of Scotland

Module Descriptor

Session: 2024/25

Title of Module: Mathematics for Design			
Code: MATH08001	**SCQF Level: 8 (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

This module builds on the algebra and calculus studied at Level 7.

The content includes:

Three-Dimensional Geometry: lines and planes

Multivariable Calculus: partial differentiation and applications, double integration

Differential Equations: up to second order, first order systems (using eigenvalues/eigenvectors).

Examples and exercises test the basic concepts and show the applications of this material in engineering contexts.

The Graduate Attributes relevant to this module are given below:

- Academic: Critical thinker; Analytical; Inquiring; Knowledgeable; Problem-solver; Autonomous.
- Personal: Motivated; Resilient
- Professional: Ambitious; Driven

Module Delivery Method

Face-To-Face	Blended	Fully Online	HybridC	Hybrid 0	Work-Based Learning
☒	☐	☐	☐	☐	☐

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:
☒	☐	☐	☐	☐	☐	Add name

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

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.
L5	Click or tap here to enter text.

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

Communication, ICT and Numeracy Skills	SCQF Level **8** Ability to synthesise and communicate the results of a range of mathematical processes.	
Autonomy, Accountability and Working with others	SCQF Level **8** An ability to autonomously construct a solution to a mathematical problem. Identifying and addressing learning needs both during and outside class time.	
Pre-requisites:	Before undertaking this module, the student should have undertaken the following:	
	Module Code: MATH07010	**Module Title: Mathematics for Engineering 1**
	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	18
Tutorial/Synchronous Support Activity	18
Independent Study	164
	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:

“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.

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 ☐No ☒
School Assessment Board	Computing, Engineering & Physical Sciences
Moderator	Dr Alan Walker

External Examiner	C Guiver
Accreditation Details	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.
Changes/Version Number	2.15. Prerequisites updated Changes to Module Coordinator, moderator assessment methodology, assessment component title.

Assessment: (also refer to Assessment Outcomes Grids below)
The module is assessed by a series of coursework exercises, forming one component, and one final unseen exercise forming a second component.
Assessment 1: A series of individual coursework assignments (50%)
Assessment 2: Class Test (Unseen, closed book) (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 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**
Coursework Assignment	√	√	√	√		50%	0

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**
Class Test (unseen, closed book)	√	√	√	√		50%	2

Combined Total for All Components	**100%**	**2 hours**