



MODULE SPECIFICATION

Part 1: Information			
Module Title	Mathematical Methods		
Module Code	UFMFF9-30-2	Level	Level 5
For implementation from	2020-21		
UWE Credit Rating	30	ECTS Credit Rating	15
Faculty	Faculty of Environment & Technology	Field	Engineering, Design and Mathematics
Department	FET Dept of Engin Design & Mathematics		
Module type:	Standard		
Pre-requisites	Calculus and Numerical Methods 2020-21		
Excluded Combinations	None		
Co- requisites	None		
Module Entry requirements	None		

Part 2: Description
<p>Educational Aims: See Learning Outcomes</p> <p>Outline Syllabus: Vector Calculus: Vector and Scalar Fields; grad, div and curl Line Integrals and scalar potential Double integrals; Surface Integrals; Volume Integrals Integral Theorems</p> <p>Partial Differential Equations: Fourier Series: Periodic functions; Definitions and concepts; Evaluation of Fourier coefficients; Convergence; Odd and Even functions Introduction to Partial Differential Equations. Change of variables; Separation of variables. Boundary value problems. Fourier Series solutions; Use of Sine and Cosine Series.</p> <p>Nonlinear Mathematics: One-dimensional (1D) linear and affine maps. 1D Nonlinear maps: fixed points; stability; linearisation theorem. Periodic points; cycles; stability of cycles; application.</p>

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<p>Bifurcation; Period doubling. Sarkovskii's Theorem; chaos</p> <p>Numerical Methods: Polynomial approximations; Cubic splines Numerical Integration: Trapezoidal rule + error analysis; Gaussian quadrature; Root finding: Bisection method. fixed-point iteration + analysis</p> <p>Teaching and Learning Methods: The module is delivered by means of lectures and tutorials or workshops. To prepare for assessment, students will be expected to undertake self-directed learning in addition to the directed learning which supports taught classes.</p> <p>Contact time 72 hours Assimilation and development of knowledge 150 hours Coursework preparation 39 hours Examination preparation 39 hours TOTAL 300 HOURS</p> <p>Scheduled teaching hours will take the form of: (i) A weekly whole group lecture, used to deliver new material and to consolidate previous material, and (ii) A weekly small-group session, in the form of either a computer workshop or a tutorial</p>

Part 3: Assessment			
<p>The assessment strategy is designed to assess achievement of the learning outcomes, to support the development of skills and to provide individual feedback such that students are aware of their progress and level of achievement during the year.</p> <p>Component B consists of a group work assignment and a controlled conditions coursework. The group work assignment not only enables students to engage with a practical element of the module, coding, but also to manage team work. The controlled conditions coursework will involve an extended investigation as per a normal assignment, but the assessment of that activity will be through a short test.</p> <p>Component A consists of an e-assessment mid-way through the semester to provide rapid feedback. The end of module examination assesses work covered in the second semester.</p>			
First Sit Components	Final Assessment	Element weighting	Description
Examination (Online) - Component A	✓	40 %	Online Written examination
Online Assignment - Component A		10 %	E-assessment
Group work - Component B		25 %	Group assignment B2
Examination (Online) - Component B		25 %	Controlled conditions coursework (online)
Resit Components	Final Assessment	Element weighting	Description
Examination (Online) - Component A	✓	50 %	Online Written examination
Written Assignment - Component B		50 %	Written assignment

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Part 4: Teaching and Learning Methods																	
Learning Outcomes	<p>On successful completion of this module students will achieve the following learning outcomes:</p> <table border="1"> <thead> <tr> <th style="text-align: left;">Module Learning Outcomes</th> <th style="text-align: left;">Reference</th> </tr> </thead> <tbody> <tr> <td>Solve mathematical problems using an understanding of the concepts, processes and techniques underlying a range of advanced mathematical methods</td> <td>MO1</td> </tr> <tr> <td>Show an understanding of the strengths and limitations of such methods</td> <td>MO2</td> </tr> <tr> <td>Use mathematical methods for problem analysis and solution in a range of application areas</td> <td>MO3</td> </tr> <tr> <td>Use a computer algebra tool to apply mathematical methods in a range of problems</td> <td>MO4</td> </tr> <tr> <td>Communicate mathematical ideas and concepts in written form</td> <td>MO5</td> </tr> </tbody> </table>	Module Learning Outcomes	Reference	Solve mathematical problems using an understanding of the concepts, processes and techniques underlying a range of advanced mathematical methods	MO1	Show an understanding of the strengths and limitations of such methods	MO2	Use mathematical methods for problem analysis and solution in a range of application areas	MO3	Use a computer algebra tool to apply mathematical methods in a range of problems	MO4	Communicate mathematical ideas and concepts in written form	MO5				
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Reading List	<p>The reading list for this module can be accessed via the following link:</p> <p>https://uwe.rl.talis.com/modules/ufmff9-30-2.html</p>																

Part 5: Contributes Towards
<p>This module contributes towards the following programmes of study:</p> <p>Mathematics with Qualified Teacher Status (QTS) [Sep][FT][Frenchay][3yrs] BSc (Hons) 2019-20</p> <p>Mathematics [Sep][FT][Frenchay][3yrs] BSc (Hons) 2019-20</p> <p>Mathematics [Sep][SW][Frenchay][4yrs] BSc (Hons) 2019-20</p> <p>Mathematics and Statistics {Foundation} [Sep][SW][Frenchay][5yrs] BSc (Hons) 2018-19</p> <p>Mathematics and Statistics {Foundation} [Sep][FT][Frenchay][4yrs] BSc (Hons) 2018-19</p> <p>Mathematics {Foundation} [Sep][SW][Frenchay][5yrs] BSc (Hons) 2018-19</p> <p>Mathematics {Foundation} [Sep][FT][Frenchay][4yrs] BSc (Hons) 2018-19</p> <p>Mathematics with Qualified Teacher Status (QTS) {Foundation} [Sep][FT][Frenchay][4yrs] BSc (Hons) 2018-19</p>