MODULE SPECIFICATION

Part 1: Information			
Module Title	Mathematical Methods		
Module Code	UFMFF9-30-2	Level	Level 5
For implementation from	2019-20		
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 2019-20		
Excluded Combinations	None		
Co- requisites	None		
Module Entry requirements	None		

Part 2: Description

Educational Aims: See Learning Outcomes

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

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.

Nonlinear Mathematics:
One-dimensional (1D) linear and affine maps.
1D Nonlinear maps: fixed points; stability; linearisation theorem.
Periodic points; cycles; stability of cycles; application.

Bifurcation; Period doubling.
Sarkovskii's Theorem; chaos

Numerical Methods:
Polynomial approximations; Cubic splines
Numerical Integration: Trapezoidal rule + error analysis; Gaussian quadrature;
Root finding: Bisection method. fixed-point iteration + analysis

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.

Contact time 72 hours
Assimilation and development of knowledge 150 hours
Coursework preparation 39 hours
Examination preparation 39 hours
TOTAL 300 HOURS

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

Part 3: Assessment

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.

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.

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.

First Sit Components	**Final Assessment**	**Element weighting**	**Description**
In-class test - Component A		10 %	E-assessment
Group work - Component B		25 %	Group assignment B2
Examination - Component B		25 %	Controlled consitions coursework
Examination - Component A	✓	40 %	Written examination (2hours)
Resit Components	**Final Assessment**	**Element weighting**	**Description**
Written Assignment - Component B		50 %	Written assignment
Examination - Component A	✓	50 %	Written examination (2 hours)

Part 4: Teaching and Learning Methods

Learning Outcomes

On successful completion of this module students will achieve the following learning outcomes:

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

Contact Hours

Independent Study Hours:	
Independent study/self-guided study	228
Total Independent Study Hours:	228
Scheduled Learning and Teaching Hours:	
Face-to-face learning	72
Total Scheduled Learning and Teaching Hours:	72
Hours to be allocated	300
Allocated Hours	300

Reading List

The reading list for this module can be accessed via the following link:

https://uwe.rl.talis.com/modules/ufmff9-30-2.html

Part 5: Contributes Towards
This module contributes towards the following programmes of study: Mathematics and Statistics [Sep][SW][Frenchay][4yrs] BSc (Hons) 2018-19 Mathematics [Sep][SW][Frenchay][4yrs] BSc (Hons) 2018-19 Mathematics [Sep][SW][Frenchay][5yrs] MMath 2018-19 Mathematics with Qualified Teacher Status (QTS) [Sep][FT][Frenchay][3yrs] BSc (Hons) 2018-19 Statistics [Sep][FT][Frenchay][3yrs] BSc (Hons) 2018-19 Mathematics and Statistics [Sep][FT][Frenchay][3yrs] BSc (Hons) 2018-19 Mathematics [Sep][FT][Frenchay][4yrs] MMath 2018-19 Mathematics [Sep][FT][Frenchay][3yrs] BSc (Hons) 2018-19