MODULE SPECIFICATION

Part 1: Information			
Module Title	Complex Variables		
Module Code	UFMFT7-15-2	Level	Level 5
For implementation from	2019-20		
UWE Credit Rating	15	ECTS Credit Rating	7.5
Faculty	Faculty of Environment & Technology	Field	Engineering, Design and Mathematics
Department	FET Dept of Engin Design & Mathematics		
Module type:	Standard		
Pre-requisites	None		
Excluded Combinations	None		
Co- requisites	None		
Module Entry requirements	None		

Part 2: Description

Overview: The study of complex variables provides a powerful tool for solving a wide array of problems arising in applications. We investigate the nature of functions in the complex plane and focus on the integration of these functions along curves in the complex plane. The analytical nature of complex functions is explored and from this, we state and prove the main theorems such as Cauchy's theorem and the Cauchy Integral Formula. On the way we prove the Fundamental Theorem of Algebra and evaluate real integrals which seem impossible by any other method.

Educational Aims: See Learning Outcomes.

Outline Syllabus: Review of complex numbers: representation, Argand diagram, De Moivre's Theorem.

Functions of a Complex Variable: Definitions, power series, analytic functions, limits and derivatives of functions of a complex variable, Cauchy-Riemann equations. Ideal fluids.

Complex integration: Contour integration, Cauchy's theorem, Cauchy's integral formula. Taylor series and Laurent series. Singularities, residues and the residue theorem. Applications such as the evaluation of real, definite integrals and principal value integrals.

Teaching and Learning Methods: The module is delivered by means of lectures and tutorials or workshops. Complex Variables theory requires careful presentation and the notes are written to be self-contained. To prepare for assessment, students will be expected to prepare solutions to pre-set questions from worksheets. The solutions will then be discussed in detail in the tutorial.

Scheduled teaching hours will take the form of:

(i) Whole group lectures, used to deliver new material and to consolidate previous material

(ii) Small-group tutorials, with activities designed to enhance the understanding of the material delivered in the lectures and to apply the skills and knowledge learned from the lectures.

Scheduled classes: 37.5 hours
Assimilation and development of knowledge: 75 hours
Coursework preparation: 18 hours
Examination preparation: 19.5 hours
Total: 150 Hours

Part 3: Assessment

The examination is summative and assesses the students' understanding of concepts and techniques, and their ability to apply them in applications.

The coursework is both summative and formative. Feedback from component B is intended to assist students to prepare for the end-of-module examination. The in-class tests will assess understanding, on a regular basis, of the ideas presented in the earlier part of the course.

First Sit Components	**Final Assessment**	**Element weighting**	**Description**
In-class test - Component B		25 %	In-class tests (best two scores from three tests)
Examination - Component A	✓	75 %	Written examination (3 hours) (Final assessment)
Resit Components	**Final Assessment**	**Element weighting**	**Description**
Written Assignment - Component B		25 %	Assignment
Examination - Component A	✓	75 %	Written examination (3 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
Define and explain complex numbers in a variety of ways	MO1
Explain the meaning of an analytic function in the complex plane and be able to classify whether or not functions are analytic	MO2
Explain theorems such as Cauchy's theorem and the Cauchy integral formula and use these theorems to derive further results, such as the Fundamental Theorem of Algebra	MO3
Integrate and evaluate a complex function along a curve in the complex plane and evaluate real integrals using the sum of residues	MO4

Contact Hours

Independent Study Hours:	
Independent study/self-guided study	113
Total Independent Study Hours:	113
Scheduled Learning and Teaching Hours:	
Face-to-face learning	37
Total Scheduled Learning and Teaching Hours:	37
Hours to be allocated	150
Allocated Hours	150

Reading List

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

https://uwe.rl.talis.com/modules/ufmft7-15-2.html

Part 5: Contributes Towards

This module contributes towards the following programmes of study:

Mathematics [Sep][SW][Frenchay][4yrs] BSc (Hons) 2018-19

Mathematics [Sep][SW][Frenchay][5yrs] MMath 2018-19

Mathematics [Sep][FT][Frenchay][4yrs] MMath 2018-19

Mathematics [Sep][FT][Frenchay][3yrs] BSc (Hons) 2018-19