MODULE **DESCRIPTOR**

MODULE TITLE	FURTHER REAL ANALYSIS		
MODULE CODE	MA2821 (L5)	CREDIT VALUE	20 CREDITS (10 ECTS)
CAMPUS	UCLAN CYPRUS		
SCHOOL	SCHOOL OF SCIENCE		

MODULE **AIMS**

The aim of this course is to provide the rigorous analysis of the underlying concepts of calculus. It will also provide an introduction to extending concepts of real analysis into the complex domain.

MODULE **CONTENT**

This module will present theorems and proofs to rigorously back up ideas related to functions and calculus, and will extend concepts in real analysis to complex numbers. This will include:

Differentiation: definition of a derivative; derivatives of sums, products, and compositions of functions; Rolle's Theorem; the mean value theorems; L'Hôpital's rule; inverse functions; higher derivatives; Taylor's theorem.

Integration: the Riemann integral; classes of integrable functions; properties of integrals; the mean value theorem; the fundamental theorem of calculus; techniques of integration; improper integrals of the first and second kind.

Particular functions: the logarithmic and exponential functions, circular functions (sine and cosine)

Introduction to Complex Analysis: What complex numbers are; properties of complex numbers; complex functions and continuity; differentiability of complex functions.

INTENDED **LEARNING OUTCOMES**

On successful completion of this module a student will be able to:	
1.	State and use key theorems and results of calculus given in and related to this module.
2.	Prove key theorems and results given in and related to this module.
3.	Apply results in real analysis to the complex domain.

TEACHING **METHODS**

The module will be delivered on campus, with weekly lecture/tutorial sessions. The delivery will consist of lectures accompanied by tutorials when needed. Lectures will introduce the theory and provide examples of its application. Key elements of the learning strategy are regular worksheets in which students are encouraged to practice their analytical techniques. These will be discussed in the tutorials.

The module will be assessed principally by examination. However to facilitate and monitor the formative learning process selected set exercises will be submitted for assessment. These will present regular opportunities for feedback and feedforward. At the end of the module, students will be expected to include a reflective component in this portfolio of work. This will make up the coursework component of the module.

ASSESSMENT **METHODS**

The module is assessed through Portfolio of set exercises and a written examination.