MODULE **DESCRIPTOR**

MODULE TITLE	COMPLEX ANALYSIS		
MODULE CODE	MA3821 (L6)	**CREDIT VALUE**	20 CREDITS (10 ECTS)
CAMPUS	UCLAN CYPRUS		
SCHOOL	SCHOOL OF SCIENCE		

MODULE **AIMS**

The aim of this module is to take ideas from real analysis and develop them for application to the complex domain. The focus is on complex series and calculus in the complex plane, particularly with regards to integration. The circle is completed when results from complex analysis are applied to real problems which are difficult to solve in the real domain alone.

MODULE **CONTENT**

This module will present theorems and proofs to rigorously back up ideas related to functions and calculus in the complex domain. This will include:

Introduction: Recap of functions; branch points; logarithms; continuity and differentiability in the complex domain.

Complex integration: parametric representation; complex integration; estimation; uniform convergence.

Cauchy's Theorem: Cauchy's theorem; The Cauchy-Goursat theorem; the deformation theorem.

Consequences of Cauchy's Theorem: Cauchy's integral formulae; the fundamental theorem of algebra.

Laurent series: Taylor Series; Laurent series; singularities; the residue theorem.

Applications of contour integration: Real integrals: semicircular contours, integrals involving circular functions, Jordan's lemma, some special contours.

INTENDED **LEARNING OUTCOMES**

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

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. Printed notes will be given for each part of the course. 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 mathematical 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 a Portfolio of set exercises and a written examination.