MODULE **DESCRIPTOR**

MODULE TITLE	PARTIAL DIFFERENTIAL EQUATIONS AND INTEGRAL TRANSFORMS		
MODULE CODE	MA3831 (L6)	**CREDIT VALUE**	20 CREDITS (10 ECTS)
CAMPUS	UCLAN CYPRUS		
SCHOOL	SCHOOL OF SCIENCE		

MODULE **AIMS**

The aim of this course is to study fields, particularly subfields of the complex numbers, and their subfield structure by using Galois groups.

MODULE **CONTENT**

Partial Differential Equations

Characteristics & classification of PDEs (parabolic, elliptic, hyperbolic)
First order PDEs: Diffusion equation.
Second order PDEs: The Heat Equation. Method of Separation of Variables in Cartesian and polar co-ordinates. The Wave Equation, Vibrations of an elastic string. Laplaces Equation, Dirichlet & Neumann problems, Legendre Polynomials & their properties including orthogonality & generating functions.

Integral Transforms

Laplace Transforms: Definition; transforms of standard functions. First Shift Theorem, multiplication and division by t. Inverse transforms. Partial fractions. Transforms of derivatives. Solution of first and second order differential equations by Laplace Transforms. Solutions of simultaneous differential equations. Heaviside unit step function and its Laplace Transform. Second Shift Theorem. Use of Laplace Transforms to solve PDE's: Heat Equation, Wave Equation and Laplace's Equation.

Fourier Transforms: Transforms for derivatives for general, even and odd functions. Use of Fourier Transforms to solve PDE's.

INTENDED **LEARNING OUTCOMES**

On successful completion of this module a student will be able to:	
1.	Solve linear partial differential equations by the method of separation of variables.
2.	Appreciate the role played in the solution of PDEs by special functions such as Legendre polynomials.
3.	Demonstrate an understanding of the concepts and properties of Laplace Transforms.
4.	Apply Laplace transform techniques to solve ordinary differential equations.
5.	Apply Laplace and Fourier Transforms to solve PDEs

TEACHING **METHODS**

Classes consist of formal lectures and tutorials. Lectures introduce the theory with some proof, and provide illustrative examples. Tutorial sheets containing practice questions will be provided for the students to attempt and these will be discussed in the tutorials.

The module will be assessed principally by examination. However, questions from the tutorial sheets will be assessed to gauge student understanding and engagement throughout the year.

ASSESSMENT **METHODS**

The module is assessed through Worksheets and a Written examination.