

## MODULE DESCRIPTOR

<b>MODULE TITLE</b>	FROM GEOMETRY INTO ALGEBRA		
<b>MODULE CODE</b>	MA1612 (L4)	<b>CREDIT VALUE</b>	20 CREDITS (10 ECTS)
<b>CAMPUS</b>	UCLAN CYPRUS		
<b>SCHOOL</b>	SCHOOL OF SCIENCE		

### MODULE AIMS

The aim of the module is to introduce the student to some of the main mathematical concepts in the modern approach to geometry and develop their understanding and use of methods using these concepts.

### MODULE CONTENT

**Matrices:** Basic definitions; Matrix arithmetic; Traces, determinants, inverses, eigenvalues and eigenvectors; Orthogonal diagonalisation of symmetric matrices.

**Coordinate geometry:** Lines and circles in 2D, lines and planes in 3D.

**Transformations:** Properties and types of transformations; Matrix representations.

**Conics and Quadrics:** Definitions, properties, and classification.

**Permutations:** Permutations as mappings; Properties and representations; Permutation groups.

**Colouring Problems:** Colouring problems in 2D and 3D.

### INTENDED LEARNING OUTCOMES

On successful completion of this module a student will be able to:	
1.	Perform elementary matrix algebra operations and solving in terms of matrices how to transform a 2D or 3D shape given a sequence of manipulations.
2.	Classify a given conic or quadric.
3.	Demonstrate properties of permutations and evaluate transformations in terms of permutation.
4.	Evaluate the isometries, symmetries and rigid motions of various 2D and 3D figures.
5.	Solve colouring problems using Burnside's (Colouring) Theorem.

## TEACHING METHODS

The class contact will consist of teaching classes together with workshops. Teaching classes will introduce new material and provide examples. Students will also attempt problems during these sessions. Workshops have no new material introduced. Key elements of the learning strategy are regular sessions during which problems are attempted. Throughout the week students will be given a list of problems to attempt during that week of which a certain number will be specified to be attempted in their portfolio. Each week the portfolio will be checked to ensure a satisfactory attempt has been made in the portfolio. Normally every two weeks there will be a short test on the recent material covered in the portfolio.

The module will be assessed principally by examination. The coursework is designed to keep the students focused on a regular diet of problem solving which is essential to this subject. The portfolio ensures the correct amount and type of problems are being attempted and in conjunction with the workshops, students are able to see and maintain a steady progression through the material. To assess and grade how well the students understands all of the topics covered in the module with the benefit of all the feedback from the coursework as outlined above a final examination is used.

## ASSESSMENT METHODS

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