

Geometry & Convergence

General Description.

Credit Points : 10 - SCQF Level : 8 - Acronym : MAT-1-GCo

Core first year course for Honours Degrees in Mathematics and/or Statistics. Syllabus summary: (Coordinate and vector geometry) Vector geometry, dot and cross product, lines and planes. Matrices as linear transformations, orthogonal matrices. Coordinate geometry, conics, etc. (Sequences and iteration) Induction. Arithmetic and Geometric Progressions and their sums. Iteration to solve equations. Use of 'seq' and 'do' loops in Maple. (Convergence) Definition of convergence of sequences and some elementary results. Introduction to sums of series. Convergence of sums by comparison with integrals, convergence of standard Taylor series using the integral form of the remainder.

Entry Requirements.

- (1) This course is not accepting further student enrolments.
- (2) Pre-requisites : H-Grade Mathematics or equivalent; prior attendance at MAT-1-PCa and MAT-1-SEq or their equivalent
- (3) Prohibited combinations : MAT-1-mi2, MAT-1-am2, MAT-1-mm2, MAT-2-am2A, MAT-2-mm2A

Variants. This course has variants for visiting students, as follows

- (1) Geometry & Convergence (CPD) (VS2) (Semester 2 (Blocks 3-4))
- (2) Geometry & Convergence (CPD) (VS2) (Semester 2 (Blocks 3-4))

Delivery Information.

- (1) Normal year taken : 1st year
- (2) Delivery Period : Semester 2 (Blocks 3-4)
- (3) Contact Teaching Time : 2 hour(s) 30 minutes per week for 11 weeks

First & Subsequent Class Information. All lectures are in Lecture Theatre C, David Hume Tower, Central Area.

First class			All of the following classes		
Date	Start	End	Day	Start	End
11/01/2010	12:10	13:00	Monday	12:10	13:00
			Thursday	12:10	13:00

Tutorials. From weeks 2–11, Tuesdays at 9am, 11:10am, 12:10pm and 13:05pm, in Appleton Tower Rooms M2A, M2B and M2C. GCo tutorials will be held in weeks 3,5,7,9 and 11. GTh tutorials will be held in weeks 2,4,6,8 and 10.

Assessment Information. Coursework (which may include a Project): 15%; Degree Examination: 85%.

The lecturer issues an assignment every second week. Your assignment solution should be handed in just before the Friday lecture preceding the tutorial—put your hand-in in the folder that has the same number as your tutorial group. (The folders are placed on tables outside the lecture theatre). Solutions to the assignment cannot be accepted after the deadline.

Examinations. A degree examination lasting 2 hours will take place in April/May. A resit exam takes place in August for those who fail to attain a sufficient grade in the April/May examination. In August, the mark given is the better of the following two: one calculated as in April/May and the other calculated from the resit examination alone.

Exam times					
Diet	Month	Paper	Code	Name	Length
1ST	May	1	-	-	2 hours
2ND	August	1	-	-	2 hours

Regulations for Hand-In Work. For Geometry & Convergence, five items of work should be handed in for marking. The marks for the best 4 out of 5 Assignments will count 15% towards your final course assessment. Marks for hand in Assignments will not contribute towards your final course assessment if the work is submitted after the deadline.

Summary of Intended Learning Outcomes.

- (1) Ability to compute dot, cross and triple vector products.
- (2) Ability to perform vector algebra manipulations using expansion of $a \times (b \times c)$ and properties of the various products.
- (3) Ability to use vector methods to attack elementary problems in geometry.
- (4) Familiarity with the idea of a matrix giving a transformation of \mathbf{R}^2 or \mathbf{R}^3 .
- (5) Familiarity with rotation and reflection matrices in the plane.
- (6) Familiarity with the standard form of conics and their graphs.
- (7) Ability to construct proofs by induction in concrete problems.
- (8) Familiarity with AP's, GP's and their sums.
- (9) Understanding the 'sequence', 'set' and 'list' datatypes in Maple.
- (10) Ability to write simple 'do' loops in Maple.
- (11) Familiarity with the concept of iteration of a function.
- (12) Intuitive understanding of the idea of convergence of sequences and series.

Contact and Further Information. The Course Secretary should be the first point of contact for all enquiries.

Course Secretary.

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Course Website

School Website

College Website

This document is based on the DRPS page.