

Introduction to Mathematical Thinking

This is a course offered in the II Semester and is compulsory for students pursuing a BA Honours with a Major in Mathematics. This is the first of twelve specified courses that students of Mathematics Honours have to take to complete requirements of their BA degree. This is a 4 credit course.

The aim of this course is to introduce the student to read, write and think mathematically. This course will offer a gentle introduction to abstract thinking which is essential for pursuing an Honours degree in Mathematics.

The course has three main modules. The first covers elements of discrete mathematics through topics like Induction, Fundamental Theorem of Arithmetic, Euclid's Division Algorithm, Greatest Common Divisor, Congruences, Proofs (like Euler's infinitude of primes, \sqrt{n} irrational for n non-square).

The second module introduces learners to Linear Algebra through the following topics: Real Coordinate Space, Vectors, Vector Addition, Scalar Multiplication, Linear Combinations, Linear Independence and Dependence, Linear Transformations and Geometric Transformations.

The third module provides an entry point to Real Analysis. After a quick review of functions the topics covered will be The Real line and Absolute Value, Statement of the Archimedean Property, Sequence of Real numbers, Limit of a Sequence, Algebra of Convergent Sequences and Sequential limit of a function.

There will also be computer based lab work for many of the topics covered in the course.

Assessment for the course will consist of class tests, mid-semester and end-semester exams, lab tests and group presentations or projects.