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# Math40002: Analysis I

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Modification of lectures notes by Richard Thomas

*Obvious is the most dangerous word in mathematics.*

- E.T. Bell

*The irreducible price of learning is realizing that you do not know.*

- James Baldwin

We will build on MATH40001 “Introduction to University Mathematics”, practising the language, logic and rigour of pure mathematics.

We will learn to formulate rigorous definitions and proofs, forming a solid foundation for future courses in pure and applied mathematics.

We will have infinite fun.

## Syllabus

**Real numbers:** Review of rational and real numbers. (Un)countability. Triangle inequalities. Suprema and infima.

**Limits of sequences:** definitions, techniques, results and examples. Tests for convergence. Cauchy sequences. Bolzano-Weierstrass theorem.

**Summing infinite series:** definitions, results and examples. Tests for convergence. Manipulation of convergent series.

**Continuity:** definition of continuous functions.

## Books - on Leganto (accessible on Blackboard)

Martin Liebeck *A Concise Introduction to Pure Mathematics*.

Mary Hart, *Guide to Analysis*.

KG Binmore, *Mathematical Analysis, A Straightforward Approach*.

David Brannan, *A first course in mathematical analysis*.

Steven Lay, *Analysis: with an introduction to proof*.

Stephen Abbott, *Understanding analysis*.

## Assessment

Quiz 1 – 1% - released Friday, November 4th and due Tuesday, November 8th

Quiz 2 – 1% - released Friday, November 11th and due Tuesday, November 15th

Fall Midterm – 5%

Quiz 3 – 1% - released Friday, November 25th and due Tuesday, November 29th

Quiz 4 – 1% - released Friday, December 2nd and due Tuesday, December 6th

Quiz 5 – 1% - released Friday, December 9th and due Tuesday, December 13th

January Test – 10%

Spring assignments and Midterm – 10%

May Exam (covering both Fall and Spring material) – 70%.

**Note:** For term 1, all quizzes will be completed on blackboard, and are due by 1:00PM on their due date.

## Discussion

We will be using the edStem discussion platform for discussion. The system is highly catered to getting you help fast and efficiently from classmates, the GTAs, and the instructors. Rather than emailing questions to the teaching staff, I encourage you to post your questions on edStem.

The discussion for our module can be found at

<https://edstem.org/us/courses/29916>