

ECON8007
Mathematical Techniques for Advanced Economic Analysis

COURSE OUTLINE
(Preliminary)
Summer 2024

Administration

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Course description

The course is designed to help students prepare for graduate studies in economics at the Australian National University and is targeted towards:

- (i) incoming doctoral students with minimal college-level mathematics and
- (ii) master students at the convener's suggestion.

This course will explain and review the mathematical techniques most relevant for economic analysis and economic understanding. It will build up to optimization in a coherent manner, with the ultimate objective being the ability to apply appropriate techniques to optimization problems.

Course schedule

The course will run purely in-person from Monday 8 January to Thursday 25 January 2024. lecturer will hold office hours during the tutorial period to discuss the course material with students.

Mon	Tue	Wed	Thu	Fri
8 Jan (L1, T1)	9 Jan (L2, T2)	10 Jan (Q1)	11 Jan (L3, T3)	12 Jan (L4, T4)
15 Jan (L5, T5)	16 Jan (L6, T6)	17 Jan (Q2)	18 Jan (L7, T7)	19 Jan (L8, T8)
22 Jan (L9, T9)	23 Jan (L10, T10)	24 Jan	25 Jan (Final Exam)	

L: Lecture (10am-12pm)

T: Tutorial (12pm-1pm)

Q: Quiz (5pm-6pm)

Assessment

There will be 4 basic assessment tasks for this course:

1. **Pre-course test** : 0% of the grade

This quiz aims to understand the class's current math skills, recommended to be done before 8 Jan. Please try to solve it independently, without AI assistance. The results are only for assessing our collective knowledge base, so don't stress over your scores!

2. **In-class test** : 10% of the grade
3. **Online quizzes** : 40% of the grade
4. **Final exam** : 50% of the grade

The detail about online quizzes and final exam will be uploaded on the Wattle page.

Course resources

Different textbooks will be used for the course. However, the main one for the course is:

Simon, C. P., & Blume, L. (1994). *Mathematics for economists* (Vol. 7). New York: Norton.

Note that lecture material will be provided on Wattle page.

Tentative topics

- Sets and numbers
- Logic and proof methods
- Function
- Euclidean spaces
- Introduction to linear algebra
- Matrix algebra
- Differentiation
- Integrals
- Differential equations
- Unconstrained optimization
- Constrained optimization