

ECON8007
Mathematical Techniques for Advanced Economic Analysis

COURSE OUTLINE
(Preliminary)
Summer 2023

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 in dual delivery mode from Monday 16 January to Friday 10 February 2023.

Course material will be uploaded on the course Wattle page almost every weekday during the course period. The detailed schedule of lectures and tutorials will be announced on the Wattle page. The lecturer will hold office hours during the course period to discuss the course material with students.

Assessment

There will be two basic assessment tasks for this course:

1. **Online quizzes** : 40% of the grade
2. **Final exam** : 60% 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 ones for the course are:

Hoy, M., Livernois, J., McKenna, C., Rees, R., & Stengos, T. (2011). *Mathematics for economics*. MIT press.
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
- Functions
- Euclidean spaces
- Introduction to linear algebra
- Matrix algebra
- Differentiation
- Differential equations
- Unconstrained optimization
- Constrained optimization