ECON8007
Mathematical Techniques for Advanced Economic Analysis

COURSE OUTLINE
(Preliminary)
Summer 2027

Course contacts

For information on administrative and registration matters, please contact:

enquiries.rse@anu.edu.au

Administration

Lecturer in charge: Jose Rodrigues Neto
Location: H.W Arndt Building, RSE, ANU, Canberra ACT 2600
E-mail: jose.neto@anu.edu.au
Office hours: immediately after class. We will finish early to allow students to ask individual questions.
This course is informal, free of charge, and will be entered in students' academic records.

Course description

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

(i) incoming economics and finance doctoral students in need of a refresher of their college-level mathematics,

and

(ii) RSE master students after they pass EMET7001. We teach ECON8007 to help students prepare for the challenging courses of the second semester of the RSE master programs. We highly encourage all RSE master students to take ECON8007 after they completed EMET7001.

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 lectures will run purely in-person from Monday 8 February to Friday 19 February 2027 (except Wednesdays).

The detailed schedule of lectures and tutorials will be announced on the Course Canvas page. Students will have the opportunity to discuss 1-1 with the lecturer to clarify the concepts and solve problems.

Assessment

There will be two informal assessment tasks for this course, one on each Friday: Test 1 and Test 2. These assessments are purely informal and will never be in the academic record of students.

Course resources

The main textbook will be provided for free to all students via Canvas.
We also recommend the following auxiliary textbook:

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

Tentative topics

- Basic logic and proof methods
- Sets, numbers, operations, basic algebra: equations and inequalities
- Binary relations and functions (polynomial functions, exponentials, logs, rational functions, exotic functions)
- Limits, lateral limits, and continuity
- Differentiation
- Optimizations of functions of a single real variable
- Indefinite and definite integrals
- Matrix algebra
- Euclidean spaces
- Introduction to linear algebra
- Optimization
- Constrained optimization
- Applications, especially the utility maximization problem of a consumer