Econ 4413

Optimisation for Economics and Financial Economics / Mathematical Techniques in Economics I

Mode of Delivery	On campus
Prerequisites	As listed in *Programs and Courses*
Incompatible Courses	As listed in *Programs and Courses*
Course Convener:	Dr Yijuan Chen
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Office hours for student consultation:	To be announced
Research Interests	Health economics; Industrial organization
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SEMESTER 2, 2018

COURSE OVERVIEW
Course Description

This course aims to introduce students to a wide range of mathematical concepts and techniques that are in frequent use in economics, finance and other business subjects in a formal way. Students who complete this course successfully will be able to read most undergraduate-level and introductory postgraduate-level technical economics books.

The course will start from multivariate calculus, followed by static optimization with equality and inequality constraints. Preliminary real analysis will be taught in order to illustrate several main Theorems behind the principles that we use in optimization. Selected rigorous proofs will be demonstrated to help understanding of the Theorems.

Learning Outcomes

By the end of the course students will be able to:

• formulate economic problems in mathematical terms and apply the tools provided in the module for analysing them

• demonstrate an understanding of many of the common functional forms used in economics and finance

• understand the mathematical methods that are most widely used in economics, both from a formal, abstract perspective, and an intuitive perspective

• know how to read, understand, and construct simple mathematical proofs, and appreciate their role in the derivation of mathematical concepts and structures

• apply mathematical methods and techniques that are formulated in abstract settings to concrete economic application

Assessment Summary

Assessment Task	Value	Due Date	Date for Return of Assessment
1. Mid-semester Exam	40%	Week 7	Week 9
2. Final Exam	60 %	Final exam period	Final exam period

The mid-semester exam will be partially redeemable: If a student does better in the final exam than in the mid-semester exam, then the weight of the former will be 70%, and the latter 30%.

Required Resources

"A First Course in Optimization Theory", by Rangarrajan Sundaram

"Mathematics for Economists", by Carl Simon and Lawrence Blume

COURSE SCHEDULE

Below is a tentative schedule of the course. The actual schedule may vary depending on the week-by-week progress of the course.

Week	Summary of Activities	Assessment
1	Basic Real Analysis I	Exam
2	Multivariate Calculus I: Derivatives	Exam
3	Multivariate Calculus II: Implicit Function Theorem	Exam
4	Unconstrained Optimization	Exam
5-6	Basic Real Analysis II	Exam
7-8	Constrained Optimization I: The Weierstrass Theorem; Equality Constraints and the Theorem of Lagrange	Exam
9-10	Constrained Optimization II: Inequality Constraints and the Theorem of Kuhn and Tucker	Exam
11-12	The Maximum Theorem; Continuity of Correspondence Revision	Exam
	Examination period	

Research-Led Teaching
Classical as well as frontier research topics, methodologies, and outcomes in health economics will be introduced along the way. Students will be able to see how results from the models can be applied to analyse real world questions, and what questions remain to answer. The lecturer will present his own research in health economics, and also discuss with students their questions and thoughts that arise from their experience, observation, and study of this course.

Feedback
Staff Feedback
The lecturer will pay close attention to students' learning. Following interactions with students during lectures, tutorials, and consultations, the lecturer will provide to students, individually or as a group, timely feedback that improve their learning experience.

Student Feedback

ANU is committed to the demonstration of educational excellence and regularly seeks feedback from students. One of the key formal ways students have to provide feedback is through Student Experience of Learning Support (SELS) surveys. The feedback given in these surveys is anonymous and provides the Colleges, University Education Committee and Academic Board with opportunities to recognise excellent teaching, and opportunities for improvement.

For more information on student surveys at ANU and reports on the feedback provided on ANU courses, go to
    http://unistats.anu.edu.au/surveys/selt/students/ and
    http://unistats.anu.edu.au/surveys/selt/results/learning/

Policies

ANU has educational policies, procedures and guidelines, which are designed to ensure that staff and students are aware of the University's academic standards, and implement them. You can find the University's education policies and an explanatory glossary at:
http://policies.anu.edu.au/

Students are expected to have read the Academic Misconduct Rules 2014 before the commencement of their course.

   Other key policies include:
   • Student Assessment (Coursework)
   • Student Surveys and Evaluations

Scaling

Your final mark for the course will be based on the **raw** marks allocated for each of your assessment items. However, your final mark may not be the same number as produced by that formula, as marks may be **scaled**. Any scaling applied will preserve the rank order of raw marks (i.e. if your raw mark exceeds that of another student, then your scaled mark will exceed the scaled mark of that student), and may be either up or down.

Privacy Notice

The ANU has made a number of third party, online, databases available for students to use. Use of each online database is conditional on student end users first agreeing to the database licensor's terms of service and/or privacy policy. Students should read these carefully.

In some cases student end users will be required to register an account with the database licensor and submit personal information, including their: first name; last name; ANU email address; and other information.

In cases where student end users are asked to submit 'content' to a database, such as an assignment or short answers, the database licensor may only use the student's 'content' in accordance with the terms of service – including any (copyright) licence the student grants to the database licensor.

Any personal information or content a student submits may be stored by the licensor, potentially offshore, and will be used to process the database service in accordance with the licensors terms of service and/or privacy policy.

If any student chooses not to agree to the database licensor's terms of service or privacy policy, the student will not be able to access and use the database. In these circumstances students should contact their lecturer to enquire about alternative arrangements that are available.

SUPPORT FOR STUDENTS
The University offers a number of support services for students. Information on these is available online from http://students.anu.edu.au/studentlife/

Other Information
Building Access Hours
Both CBE and HW ARNDT are:
TEACHING PERIOD = Mon – Fri 07.45 to 21.15 and SAT, SUN and Public Holidays is not accessible by students.
Both CBE and HW ARNDT are:
NON TEACHING PERIOD = Mon – Fri 08.00 to 18.00 and SAT, SUN and Public Holidays is not accessible by students.

RSE has a Frequently Asked Questions page where you can find relevant policies and information on a broad range of topics, the onus is on the student to familiarise themselves with this page and the information available.
https://www.rse.anu.edu.au/students/students/frequently-asked-questions/