The foundations of economic theory are based on mathematical models. Thus, a thorough understanding of the economic content of such models is not possible without a clear understanding of the mathematical concepts that underpin the modeling. Together with ECON2127/ECON8014, this course forms a two-semester sequence, which introduces students to a range of mathematical concepts and techniques that form the basis of advanced economic theory courses, such as the ones required of students enrolled in Honours, Masters and PhD programs. The introduced concepts and techniques will be derived from basic principles and assumptions as thoroughly as possible, and will be illustrated using standard applications from economics.

Due to the strong interdependence between the topics covered in the two courses, students are encouraged to take both courses as a sequence in the same year. Undergraduate students who are interested in pursuing an Honours or Post-graduate degree are also advised to take these courses as early as possible during their undergraduate studies.

<table>
<thead>
<tr>
<th>Mode of Delivery</th>
<th>On campus</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prerequisites</td>
<td>As listed in Programs and Courses – links below</td>
</tr>
<tr>
<td>Incompatible Courses</td>
<td>As listed in Programs and Courses – links below</td>
</tr>
<tr>
<td>Course Convener:</td>
<td>John Stachurski</td>
</tr>
<tr>
<td>Email:</td>
<td><a href="mailto:John.stachurski@anu.edu.au">John.stachurski@anu.edu.au</a></td>
</tr>
<tr>
<td>Office hours for student consultation:</td>
<td>Monday 9am till 11am</td>
</tr>
<tr>
<td>Research Interests</td>
<td>Dynamics, econometrics</td>
</tr>
<tr>
<td>Relevant administrator if any (optional)</td>
<td>Karissa Carkeet, Room 1013, Arndt Bldg 25A</td>
</tr>
<tr>
<td>Phone:</td>
<td>(02) 61250384</td>
</tr>
<tr>
<td>Email:</td>
<td><a href="mailto:Karissa.carkeet@anu.edu.au">Karissa.carkeet@anu.edu.au</a></td>
</tr>
<tr>
<td>Tutor(s) (optional)</td>
<td>Please see Wattle</td>
</tr>
</tbody>
</table>

http://programsandcourses.anu.edu.au/course/ECON2125
http://programsandcourses.anu.edu.au/course/ECON8013
COURSE OVERVIEW

Course Description (optional)
Together with ECON2127/ECON8014, this course forms a two-semester sequence that introduces students to a range of foundational mathematical concepts and techniques routinely used in economic theory and quantitative modeling for economics, finance and business. The concepts and techniques will be derived from basic principles and illustrated using a variety of applications.

Optimization will be a recurring theme in the course, since much of economic theory involves optimization, as do a diverse range of econometric, statistical and financial problems. However, a number of other foundational topics in mathematical modeling will also be treated. These include linear algebra, dynamics and probability theory.

Learning Outcomes
Upon a successful completion of this course, students should be able to:
- Understand many of 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 applications.

Assessment Summary

<table>
<thead>
<tr>
<th>Assessment Task</th>
<th>Value</th>
<th>Due Date</th>
<th>Date for Return of Assessment</th>
<th>Linked Learning Outcomes (optional)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Mid-term exam</td>
<td>40%</td>
<td>TBA</td>
<td>TBA</td>
<td></td>
</tr>
<tr>
<td>2. Final Exam</td>
<td>60%</td>
<td>TBA</td>
<td>TBA</td>
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</tr>
</tbody>
</table>

**NOTE:** ECON2125 and ECON8013 students will be assessed in separate pools with possible variation in requirements and standards. Final grades may not be an exact sum of exam scores, due to post-processing by the university administration. This processing might alter the absolute value of individual scores but it will not affect the ranking.

Research-Led Teaching
Course content and applications will be partly driven by the lecturer's current research interests in dynamic optimization, random dynamic systems and asset pricing.

Feedback
Staff Feedback
Students will have the opportunity to provide feedback during tutorials and office hours of the tutors and lecturer, as well as through the standard student evaluation procedure.

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
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 Student Academic Integrity Policy before the commencement of their course.

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

Examination material or equipment
Details to be advised

Recommended Resources
The primary recommended text is

In past years this text has been compulsory but this year it is only recommended. It will be useful as background reading and a source of practice questions for many parts of the course. In addition students will be supplied with a PDF mini-text containing background on some parts of the course and detailed PDF lecture slides covering all course topics.

All topics are standard and plenty of useful free material can be found on the Internet on a case by case basis. For example, math.stackexchange.com can be very helpful. Other texts that might be useful to understand the course material (but are in no way required) include:
- Principles of Mathematical Analysis by Walter Rudin
- Linear Algebra by David Lay
- Calculus: Concepts and Methods by Ken Binmore and Joan Davies
- Optimization in Economic Theory by Avinash K. Dixit
- A First Course in Optimization Theory by Rangarajan Sundaram

COURSE SCHEDULE
2 lectures per week through the course of the semester, with Tutorials yet to be scheduled.

ASSESSMENT REQUIREMENTS
The ANU is using Turnitin to enhance student citation and referencing techniques, and to assess assignment submissions as a component of the University’s approach to managing Academic Integrity. For additional information regarding Turnitin please visit the ANU Online website.
Students may choose not to submit assessment items through Turnitin. In this instance you will be required to submit, alongside the assessment item itself, copies of all references included in the assessment item.

**Assessment Tasks**

**Participation**
Participation in lectures and tutorials is strongly encouraged and exam questions will be closely related to tutorial questions. Attendance itself is not directly assessed.

**Assessment Task 1: Midterm exam**
**Details of task:** To be advised

**Assessment Task 2: Final exam**
**Details of task:** To be advised

**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/](http://students.anu.edu.au/studentlife/)