Course Outline (version000 – year 2016)

EMET1001 Foundations of Economic and Financial Models

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EMET7001 Introduction to Analysis of Economic Models and Data

The course teaches the mathematical foundations of models in economics, business and finance and their applications. Mathematical topics covered include set theory, functions, series, limits, univariate and multivariate calculus, unconstrained and constrained optimisation, and matrix algebra. Applications include effective interest rates, present value, annuities, production functions, average and marginal cost functions, profit maximisation.

<table>
<thead>
<tr>
<th>Mode of Delivery</th>
<th>On campus, with lectures and tutorials</th>
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<tbody>
<tr>
<td>Prerequisites</td>
<td>none</td>
</tr>
<tr>
<td>Incompatible Courses</td>
<td>Incompatible with STAT1006. Only 1 of EMET1001 or EMET7001 can be taken.</td>
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<tr>
<td>Course Convene &amp; Lecturer:</td>
<td>Dr. José A. Rodrigues-Neto</td>
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<tr>
<td>Phone(s):</td>
<td>612 50384</td>
</tr>
<tr>
<td>Email:</td>
<td><a href="mailto:tba@anu.edu.au">tba@anu.edu.au</a></td>
</tr>
<tr>
<td>Office hours for student consultation:</td>
<td>By appointment</td>
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</tbody>
</table>

Student Administrator Ms Karissa Carkeet
Phone: 612 50384
Email: karissa.carkeet@anu.edu.au

Head Tutor Mr. or Ms. TBA @anu.edu.au
Email: See details on Wattle

SEMESTER 1 - February to June - 2016

http://programsandcourses.anu.edu.au/course/EMET1001
http://programsandcourses.anu.edu.au/course/EMET7001
COURSE OVERVIEW

Course Description
The course teaches the mathematical foundations of models in economics, business and finance and their applications. Mathematical topics covered include set theory, functions, series, limits, univariate and multivariate calculus, unconstrained and constrained optimisation, vectors, and matrix algebra. Applications include effective interest rates, present value, annuities, production functions, average and marginal cost functions, fixed and variable costs, profit maximisation, cost minimisation, and other classical problems in economics.

Learning Outcomes
By the end of the course students will:
• have a sound understanding of mathematical techniques discussed
• 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
• apply the basic principles of maximisation and minimisation to optimisation problems
• apply matrix algebra to simple economic problems and models
• make use of some basic principles of financial arithmetic in economic and financial problems

Assessment Summary

<table>
<thead>
<tr>
<th>Assessment Task</th>
<th>Value</th>
<th>Due Date</th>
<th>Date for Return of Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. mid-term exam</td>
<td>35% (redeemable)</td>
<td>See Wattle and class announcements</td>
<td>3 weeks after it</td>
</tr>
<tr>
<td>2. final exam</td>
<td>65%</td>
<td>See ANU Timetable</td>
<td>Official ANU date</td>
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</tbody>
</table>

Final Grade (tentative)
Raw final grades can be curved up or down, but the final grades (after curving) will preserve the ordinal ranking that students had in their raw final grades. The raw final grade of each student is given by 65% of the grade of her/his final exam, plus 35% of the maximum between the grades of her/his mid-term and final exams.

Students in their (expected) final semester are strongly advised to be especially cautious and do not make unchangeable plans before learning their academic results officially.

Research-Led Teaching
Problems and examples are based on cutting edge formal scientific models. These models are drawn from the highest level academic research in the relevant fields/disciplines.

Feedback – Staff Feedback
Students will be given many chances to obtain feedback in the following forms in this course:
• Verbal feedback (upon request) during the classes
• Verbal and written feedback (upon request) immediately after classes
- Verbal feedback (upon request) during small group tutorials
- Verbal and written feedback (upon request) after small group tutorials
- Availability of Office Hours (consultation times) for individual academic help from the teaching team
- Graded mid-term paper, where the answers to problems are detailed and individual explanations can be obtained during tutorials and in consultation times

Although the opportunities for detailed feedback are multiple, at university level, it is the students’ responsibility to seek academic support from the teaching team every time they need it. Students are recommended to attend all classes and one tutorial per week (except that in the first week there are no tutorials).

**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 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/

We kindly ask all students to complete the teaching evaluations in the end of the semester.

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

**Examination material or equipment**

Only pen and pencils can be used in the exams. Dictionaries are not allowed.

**Recommended Resources**

1- Teaching notes and other academic materials will be uploaded to Wattle. We suggest looking at Wattle page for the course in at least three different days per week during the semester.
2- The official textbook for this course is:


Please acquire a copy of this textbook as soon as possible and keep it at least until you see the official results for the course.

**COURSE SCHEDULE (tentative)**

Please note that topics in this course are covered at a much deeper level than in many secondary schools. So, even if the student thinks she/he has learned the topic in the past, we strongly encourage students to attend all classes and tutorials, reading the slides and the textbook, solving problems, writing their personal notes and trying to create their own examples.

<table>
<thead>
<tr>
<th>Week/Session</th>
<th>Summary of Activities</th>
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<tbody>
<tr>
<td>0</td>
<td>Students are recommended reviewing secondary school maths</td>
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<tr>
<td>1</td>
<td>Scientific Method, the scope of mathematical models, numbers and sets</td>
</tr>
<tr>
<td>2</td>
<td>Algebra, functions of one variable</td>
</tr>
<tr>
<td>3</td>
<td>Functions of one variable: graphs, properties, examples</td>
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<tr>
<td>4</td>
<td>Limits 1, and differentiation: definition and properties</td>
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<td>5</td>
<td>Examples and applications, review for the mid-term exam</td>
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<tr>
<td>6</td>
<td>Mid-term exam and its preparation/review</td>
</tr>
<tr>
<td>7</td>
<td>Continuity, limits 2, and solution to the mid-term questions</td>
</tr>
<tr>
<td>8</td>
<td>Implicit differentiation, limits 3, optimisation of functions of one variable</td>
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<tr>
<td>9</td>
<td>More on optimisation, and integration 1: definition, properties and examples</td>
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<tr>
<td>10</td>
<td>Integration 2: integration techniques and applications</td>
</tr>
<tr>
<td>11</td>
<td>Vectors and functions of many variables, matrix algebra</td>
</tr>
<tr>
<td>12</td>
<td>Introduction to optimisation of functions of many variables</td>
</tr>
<tr>
<td>13</td>
<td>Examples, applications, and review for the final exam</td>
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<tr>
<td></td>
<td>Examination period</td>
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</tbody>
</table>

**Assessment Tasks** (Tentative)

Participation in all classes and tutorials is highly recommended and expected. We will not take attendance. On average students that attend to all classes and tutorials have a significant better academic performance in exams than those that only attend ¾ of the lecturers and all tutorials. And the latter ones perform better than those attending classes less frequently.

In mathematical-economics, both the lectures and the tutorials are extremely (and equally) important.
Assessment Task 1: Mid-term Exam  
Details of task: the exam covers all materials taught until the day of this exam. It is also expected that students can relate the content of this course with primary and secondary school mathematics. Value: 35%.

Assessment Task 2: Final Exam  
Details of task: the final exam covers all materials taught in the course. It is also expected that students can relate the content of this course with primary and secondary school mathematics. A detailed list of topics will be uploaded to Wattle after classes are finished and before the final exam. Value: 65%.

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/)

ADDITIONAL REFERENCES


For students seeking a more advanced book, here’s one option:  
Calculus, 4th edition Hardcover (July 9, 2008), by Michael Spivak  
[www.amazon.com/Calculus-4th-Michael-Spivak/dp/0914098918/ref=sr_1_1?ie=UTF8]