ECON4202/ECON6201
Advanced Econometric Theory and Methods
(SIMULATION BASED ECONOMETRIC METHODS)

Course Outline
Semester 2, 2015

Part A: Course-Specific Information

Students are also expected to have read and be familiar with Part B Supplement to All Course Outlines. This contains Policies on Student Responsibilities and Support, Including Special Consideration, Plagiarism and Key Dates. It also contains the Business School PROGRAM LEARNING GOALS.
**Table of Contents**

1 STAFF CONTACT DETAILS 1  
1.1 Communications with staff 1  
2 COURSE DETAILS 1  
2.1 Teaching Times and Locations 1  
2.2 Units of Credit 1  
2.3 Summary of Course 1  
2.4 Aims and Relationship to Other Courses 1  
2.5 Student Learning Outcomes 2  
3 LEARNING AND TEACHING ACTIVITIES 4  
3.1 Approach to Learning and Teaching in the Course 4  
3.2 Learning Activities and Teaching Strategies 4  
4 ASSESSMENT 5  
4.1 Formal Requirements 5  
4.2 Assessment Details 5  
4.3 Assignments 5  
4.4 Weekly problem sets 5  
4.5 Midsession exam 5  
4.6 Final Exam Format 6  
4.7 Quality Assurance 6  
5 COURSE EVALUATION AND DEVELOPMENT 6  
6 COURSE RESOURCES 6  
7 COURSE SCHEDULE 8
1 STAFF CONTACT DETAILS

Lecturer-in-charge: Chris Carter
Office: Room 404, School of Economics
Telephone Number: 02 9385 9696
Email: chris.carter@unsw.edu.au
Consultation Times: Thursday 2-5 pm

1.1 Communications with staff
You should feel free to contact me about any academic matter. However, it is strongly encouraged, for efficiency, that all enquiries about the subject material are made at lectures or during consultation time. Discussion of course subject material will not be entered into via lengthy emails.

Email correspondence on administrative matters will be responded to within 48 hours, but not over weekends. Please note I have no advance notice of the date and time of the exam.

2 COURSE DETAILS

2.1 Teaching Times and Locations
Lectures start in Week 1. The time and location are: Wed 18:00-21:00, Business School 105
Computer Lab: Quad 1042, 8:00 -9:30 pm. Some weeks we will just have a lecture from 6:00 pm to 9:00 pm, and sometimes we will use the Lab.

2.2 Units of Credit
The course is worth 6 units of credit. This course is taught in parallel to both undergraduate and postgraduate students.

2.3 Summary of Course
This course covers a selection of advanced econometric methods such as maximum likelihood, generalised methods of moments, simulated maximum likelihood, simulated methods of moments, Bayesian inference, and bootstrap methods. Irrespective of the particular topics taught in any year, the course will emphasise the theoretical foundations of methods and their application to substantive economic problems in areas such as financial econometrics, micro-econometrics and macro-econometrics. This course is designed for students who want to acquire a higher level of knowledge in the area of econometrics beyond that expected of a good applied economist.

2.4 Aims and Relationship to Other Courses
The course will introduce the students to modern simulations based inference and a range of applications of applications of such inference.

The pre-requisite of this course is ECON3203 (Econometric Theory and Methods) or equivalent. This course, building on ECON3203, will introduce
advanced elements in econometrics and provide a good background for students to access modern econometric techniques. For MEc students, the prerequisite is ECON6003 (Econometric Analysis).

2.5 Student Learning Outcomes

The Course Learning Outcomes are what you should be able to DO by the end of this course if you participate fully in learning activities and successfully complete the assessment items.

The Learning Outcomes in this course also help you to achieve some of the overall Program Learning Goals and Outcomes for all coursework students in the Business School. Program Learning Goals are what we want you to BE or HAVE by the time you successfully complete your degree. You demonstrate this by achieving specific Program Learning Outcomes - what you are able to DO by the end of your degree.

For more information on the Program Learning Goals and Outcomes, see Part B of the course outline.

The following table shows how your Course Learning Outcomes relate to the overall Program Learning Goals and Outcomes, and indicates where these are assessed:
<table>
<thead>
<tr>
<th>Program Learning Goals and Outcomes</th>
<th>Course Learning Outcomes</th>
<th>Course Assessment Item</th>
</tr>
</thead>
<tbody>
<tr>
<td>This course helps you to achieve the following learning goals</td>
<td>On successful completion of the course, you should be able to:</td>
<td>This learning outcome will be assessed in the following items:</td>
</tr>
<tr>
<td>1 Knowledge</td>
<td>Describe the main features of the econometric methods and their statistical properties covered in the course. Present and interpret the outcome of econometric modelling.</td>
<td>• Assignments  • Mid-session exam  • Final exam</td>
</tr>
<tr>
<td>2 Critical thinking and problem solving</td>
<td>Select and implement learned methods to practical problems. Critically appraise empirical studies from the viewpoint of modern econometrics.</td>
<td>• Assignments  • Mid-session exam  • Final exam</td>
</tr>
<tr>
<td>3a Written communication</td>
<td>Describe the main features of the econometric methods and their statistical properties covered in the course. Present and interpret the outcome of econometric modelling.</td>
<td>• Assignments  • Mid-session exam  • Final exam</td>
</tr>
<tr>
<td>3b Oral communication</td>
<td>Communicate ideas in a succinct and clear manner.</td>
<td>Class participation but not specifically assessed.</td>
</tr>
<tr>
<td>4 Teamwork</td>
<td>Work collaboratively to practise the techniques/knowledge learned from lectures and reading.</td>
<td>Not specifically assessed</td>
</tr>
<tr>
<td>5a Ethical, environmental and sustainability considerations</td>
<td>Not specifically addressed in this course.</td>
<td>Not specifically assessed</td>
</tr>
<tr>
<td>5b Social and cultural awareness</td>
<td>Not specifically addressed in this course.</td>
<td>Not specifically assessed</td>
</tr>
</tbody>
</table>
3 LEARNING AND TEACHING ACTIVITIES

3.1 Approach to Learning and Teaching in the Course
The philosophy underpinning this course and its Teaching and Learning Strategies are based on “Guidelines on Learning that Inform Teaching at UNSW. These guidelines may be viewed at: www.guidelinesonlearning.unsw.edu.au. Specifically, the lectures and assessment have been designed to appropriately challenge students and support the achievement of the desired learning outcomes. A climate of inquiry and dialogue is encouraged between students and teachers and among students (in and out of class). The lecturer aims to provide meaningful and timely feedback to students to improve learning outcome.

3.2 Learning Activities and Teaching Strategies
The examinable content of the course is defined by the references given in the Lecture Schedule, the content of Lectures, and the content of the Tutorial Program.

Lectures
The purpose of lectures is to provide a logical structure for the topics that make up the course; to emphasise the important concepts and methods of each topic; and to provide relevant examples to which the concepts and methods are applied.

Reading
Each lecture must be supplemented by assigned reading material (relevant sections of the textbook). The aim of reading is to deepen and broaden the major points made in the lectures. Students are advised to complete the reading tasks before attempting tutorial exercises.

Assignments
Assignments enable students to independently practice on the learned materials and demonstrate their understanding and creativity.

Study Strategies
While students may have preferred individual learning strategies, it is important to note that most learning will be achieved outside of class time. Lectures can only provide a structure to assist your study, and tutorial time is limited.

A “model” strategy:
   i. Accessing the lecture notes/slides from Moodle before the lecture. This will give you a general idea of the topic area.
   ii. Attendance at lectures. Here the context of the topic in the course and the important elements of the topic are identified. The relevance of the topic will be explained.
   iii. Reading the relevant chapter(s) of the textbook and attending tutorials after attempting the tutorial questions.
4 ASSESSMENT

4.1 Formal Requirements
In order to pass this course, you must:
- achieve a composite mark of at least 50 out of 100;
- make a satisfactory attempt at ALL assessment tasks and a mark of at least 40% in each assessment task.

4.2 Assessment Details

<table>
<thead>
<tr>
<th>Assessment Task</th>
<th>Weight</th>
<th>Given out</th>
<th>Due Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assignment 1</td>
<td>15%</td>
<td>Week 5</td>
<td>Week 7</td>
</tr>
<tr>
<td>Assignment 2</td>
<td>15%</td>
<td>Week 9</td>
<td>Week 11</td>
</tr>
<tr>
<td>Mid-session Exam</td>
<td>20%</td>
<td>1 hour and 20 minutes</td>
<td>Week 8</td>
</tr>
<tr>
<td>Final Exam:</td>
<td>50%</td>
<td>2 hours</td>
<td>University Exam Period</td>
</tr>
<tr>
<td>Total</td>
<td>100%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Employment obligations or holiday/travel plans of any kind are not acceptable reasons for failing to complete any assessment items.

In case of severe sickness, an application for special consideration must be lodged online through myUNSW within 3 working days of the assessment (Log into myUNSW and go to My Student Profile tab > My Student Services channel > Online Services > Special Consideration). Then submit the originals or certified copies of your supporting documentation and a completed Professional Authority form (pdf - download here) to Student Central.

4.3 Assignments
The assignments give students opportunities to demonstrate their understanding of the learned principles/techniques and their ability to independently apply them to practical problems.

The assignment topics, format and marking criteria are set out in a separate document on the course website.

4.4 Weekly problem sets
These will give you practice on the material.

4.5 Midsession exam
This will be held in class time and is designed to give both you and me a chance to assess how you are doing.
4.6 Final Exam Format
This will be held in the University examination period. The final exam will cover the entire course. The purpose of the final exam is to assess students' overall comprehension of concepts, principles, techniques, their appropriate usage, and their interpretations in data analysis.

4.7 Quality Assurance
The Business School is actively monitoring student learning and quality of the student experience in all its programs. A random selection of completed assessment tasks may be used for quality assurance, such as to determine the extent to which program learning goals are being achieved. The information is required for accreditation purposes, and aggregated findings will be used to inform changes aimed at improving the quality of Business School programs. All material used for such processes will be treated as confidential and will not be related to course grades.

5 COURSE EVALUATION AND DEVELOPMENT
Each year feedback is sought from students and other stakeholders about the courses offered in the School and continual improvements are made based on this feedback. UNSW's Course and Teaching Evaluation and Improvement (CATEI) Process is one of the ways in which student evaluative feedback is gathered. You are strongly encouraged to take part in the feedback process.

6 COURSE RESOURCES
The website for this course is on UNSW Moodle at: http://moodle.telt.unsw.edu.au

The lectures will be based on notes handed out in class.

Supplementary Readings: The items that are starred are the most relevant to the course.

• * Greenberg, E. (2008), Introduction to Bayesian Econometrics, Cambridge University Press.


• Train, K.E. (2002), *Discrete Choice Methods with Simulation*, Cambridge University Press (available online)

**Journal articles:** These will be provided during the course.
## 7 COURSE SCHEDULE

### Lecture Schedule

Lectures start in Week 1 and finish in Week 12. There will be a tutorial session in Week 13.

<table>
<thead>
<tr>
<th>Week</th>
<th>Topics</th>
<th>Main Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Week 3 10 - 14 Aug</td>
<td>Conditionally Gaussian State Space Models. Examples and applications. Filtering and Smoothing.</td>
<td>Class notes and selected readings</td>
</tr>
<tr>
<td>Week 6 31 Aug – 4 Sep</td>
<td>Panel data Models. Maximum likelihood simulated maximum likelihood and Bayesian inference.</td>
<td>Class notes and selected articles</td>
</tr>
<tr>
<td>Week 7 7 - 11 Sept</td>
<td>Importance sampling, efficient importance sampling and applications to panel data models and time series models.</td>
<td>Class notes and selected articles</td>
</tr>
<tr>
<td>Week 8 14 - 18 Sept</td>
<td>Mid-session exam. Bayesian inference using unbiased estimates of the likelihood. Applications to panel data microeconometrics.</td>
<td>Class notes and selected articles</td>
</tr>
<tr>
<td>Week 9 21 - 25 Sept</td>
<td>Bayesian inference using unbiased estimates of the likelihood. Applications to panel data microeconometrics.</td>
<td>Class notes and selected articles</td>
</tr>
</tbody>
</table>

Mid-semester break: Saturday 26 September - Monday 5 October inclusive

| Week 10 5 - 9 Oct | (5 October is a public holiday) Sequential Monte Carlo. Applications to prediction, diagnostics, marginal likelihood estimation. Annealed importance sampling | Class notes and selected articles |
| Week 11  
12 - 16 Oct | Particle Filter. Discussion of the SIR filter, auxiliary particle filter and fully adapted filters. | Class notes and selected articles |
| Week 12  
19 - 23 Oct | Bayesian inference using the particle filter. | Class notes and selected articles |
| Week 13 | NO LECTURES |  |