Course Outline: EC3327 Econometric Theory

Course Lecturer: Jonathan Wadsworth (Autumn Term)
Office: H215A
Office Hours: Wed. 12.30-1.30pm Thrs. 5.00pm-6.00pm

Aims: To extend your econometric skills gained in EC2203, with the aim of making you better able to appreciate and undertake applied economic work. The course will combine written and computer exercises to help make you equally familiar with an extended range of econometric techniques and the practical application of these techniques. The course will begin by giving you a good grounding in the statistical techniques that underlie much econometrics. This should increase your appreciation of the techniques you have already met. The theory and applications of econometrics will then be extended in the Spring term.

Learning Outcomes: On completion of the Autumn Term you should:

- be able to formulate, estimate, test and interpret suitable models for the empirical study of economic phenomena;
- have acquired the ability to evaluate the performance of alternative econometric models through the appropriate use of tests.
- be able to demonstrate an ability to apply regression techniques using econometric software and be able to program simple estimation routines.
- feel confident about reading and interpreting applied economic journal articles.

Course Delivery: One lecture and one class hour each week. The lectures will develop the main econometric tools and theoretical arguments. There will be a weekly problem set that comprises both theoretical and computer based problems where you will learn the basics of computer programming needed to generate simple econometric results. Classes will be devoted to the study of these problem sets. Students should try to attempt all problems before their solutions are discussed in class. In order to have any realistic hope of doing well in the examination, students should attempt to do these sets every week.

Knowledge of basic undergraduate econometrics is assumed, as is elementary knowledge of calculus, statistics and matrix algebra.

Assessment: Progress and learning outcomes will be evaluated by:

- a 3-hour unseen examination, taken in the Summer term, which contributes 80% of the final mark. The final exam will comprise 2 compulsory questions (1 from each half of the course) and a choice of 2 from 4 subsequent questions.

- Two assessed computer based exercises each comprising 10% of the final course mark. The first test will be held toward the end of the first term and will cover material from the first term. The 2nd test, covering material from the Spring term will be held toward the end of the Spring term.

Reading: The main course text which covers the material taught in both terms, is

J. Wooldridge, *Introductory Econometrics*, South Western College Press, 2000 (W) **(Library code: 330.01 WOO)**

In addition

J. Stock & M. Watson, *Introduction to Econometrics*, Addison Wesley Press (SW) **(Library code: 330.01 STO)**

Johnston, Jack and John DiNardo, *Econometric Methods*, 4th Edition, McGraw-Hill, 1997. (JD) **(Library code: 330.0182 JOH)**

are useful companion texts covering much of the same material

PART I (Autumn Term)

1. Matrix Algebra and OLS Estimation
How to use matrices to simplify econometric calculations and aid understanding.

Reading: W: Appendices D and E; JD Appendix A.

2. Probability Theory
How and why density functions, distribution functions, and moment generating functions are used in econometric work

Reading: W Appendix B; JD Appendix B; SW Chapter 2

3. Distribution Theory
How and why Normal, Chi-squared, F distributions, Central Limit Theory are used in econometric work

Reading: W Appendix B; JD Appendix B; SW Chapter 2

4. Large Sample Theory
Why Asymptotic theory, Consistency. Convergence in probability can be used to choose between alternative estimators in econometrics

Reading: W Appendix C; JD Appendix B; SW Chapter 2

5. Maximum Likelihood Estimation
General properties of MLE, Asymptotic Efficiency, Cramer-Rao lower bound
Application to models of duration or binary dependent variables

Reading: W Appendix C; JD Appendix B; SW Chapter 2