# Economics 615
## Advanced Econometrics I

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| Instructor: | Eugene Choo |
| | SS446, Ph: 978 5146, |
| | email: echoo@ucalgary.ca |
| Office Hours: | Mon and Wed, 3-4pm |
| Class website: | Blackboard |
| Instruction: | SS423, Monday and Wednesday, 11.30 am |
| | 3 lecture hours a week plus occasional tutorials. |
| | Note that midterms are on Fridays 11.30am. |

- **Prerequisites:**
  Mathematical statistics or econometrics at the undergraduate level, a course in linear algebra, and a course in multivariate calculus. Or instructors consent. Linear algebra and multivariate calculus will be used frequently. Knowledge of statistical distribution theory and inference is essential.

- **Course Description :**
  This is an introductory graduate econometrics course intended to provide a rigorous foundation of econometric theory relevant for carrying out empirical work in economics. The main focus of the course is the linear regression model, although extensions to nonlinear estimation techniques like generalised method of moments and maximum likelihood are also pursued. We will also cover simple panel data models, binary choice models and time series models.

  Students will be expected to learn and use STATA and MATLAB in this course.

- **Text :**
  The course textbook is Davidson and Mackinnon, Econometric Theory and Methods. Corrections and other additional material are available at the texts web site.

  Other references you may find useful include:

  - Jeffrey M. Wooldridge, *Introductory Econometrics: A Modern Approach* - an excellent undergraduate text. Introduces all the main concepts with minimal math.

  - Stock and Watson, *Introduction to Econometrics* - an advanced undergraduate level text. It contains lucid descriptions of many econometric ideas, and may serve as a useful reminder for more basic material.

- Greene, *Econometric Analysis* - a standard graduate level text which is quite comprehensive. It contains particularly good exposition on maximum likelihood and limited dependent variable models.

- Wooldridge, *Econometric Analysis of Cross Section and Panel Data.* - a modern graduate level text with good expositions on non-time series topics. Somewhat advanced for our purposes, but an excellent reference.

- Kennedy, A Guide to Econometrics. Non-technical discussion of many concepts. A good companion to any of the graduate level texts above.

- EVALUATION :

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| 2 midterms (@ 15% each) | 30% |
| 4 to 5 problem sets | 20% |
| Final | 50 % |

The course grade is calculated using the weights indicated above. As a guide to determining standing, these letter grade equivalences will generally apply:

| A+ | 95-100 | A | 87-94 | A- | 80-86 | B+ | 75-79 | B | 65-74 |
|---|---|---|---|---|---|---|---|---|---|
| B- | 55-64 | C+ | 50-54 | C | 45-49 | D | 40-44 | F | < 40 |

If, for some reason, the distribution of grades determined using the aforementioned conversion chart appears to be abnormal the instructor reserves the right to change the grade conversion chart if the instructor, at the instructors discretion, feels it is necessary to more fairly represent student achievement.

**You must pass the final examination to receive a passing grade in the course.**

There will be a Department scheduled final examination, lasting 3 hours.

- OUTLINE :

| DATES | TOPICS | D&M CHP. |
|---|---|---|
| Jan 12 | Review of Probability, some Matrix Algebra | 1.2, 1.4 |
| Jan 14, 19 | Geometric Interpretation of OLS; Partitioned regression | 2 |
| Jan 21 | Statistical properties of OLS: Assumptions, Optimality | 3 |
| Jan 26 | Hypothesis Testing I: Exact Test, $t$, $F$, $\chi^2$ | 4, 5.1, 5.2 |
| Jan 28, 9 | Serial Correlation, Heteroskedasticity, Geometry of GLS | 7 |
| Feb 11 | Specifications and Data Problems | 3.7, 2.6 |
| Feb 13 | Midterm 1 | |
| Feb 16, 18 | Reading week | |
| Feb 23, 25 | Instrumental Variable Estimation | 8 |
| Mar 2 | Bootstrap Tests and Standard Errors | 4.6, 5.3 |
| Mar 4, 9 | Extremum Estimators: Maximum Likelihood, | 10 |
| | Generalized Method of Moments | 9 |
| | and Nonlinear Least Squares. | 6.1, 6.2, 6.3 |
| Mar 11 | Hypothesis Testing II: Wald, LM, LR tests | 5.6, 10.6 |
| | Delta Method, Nonlinear Restrictions | |
| Mar 16 | Panel Data: Fixed and Random Effect and GLS | 7.10 |
| Mar 18, 23, 25 | Limited Dependent Variables | 11 |
| Mar 27 | Midterm 2 | |
| Mar 30, Apr 1 | Time Series Models I - Stationary Models | 13 |
| Apr 6 8 | Time Series Models II - Stationary Models | 14 |
| Apr 20 22 | Tidy up loose ends, review | |

- NOTES. :
  Students seeking reappraisal of a piece of graded term work (term paper, etc.) should discuss their work with the Instructor within fifteen days of the work being returned to the class.

  It is the students responsibility to request academic accommodations. If you are a student with a documented disability who may require academic accommodation and have not registered with the Disability Resource Centre, please contact their office at 220-8237. Students who have not registered with the Disability Resource Centre are not eligible for formal academic accommodation. You are also required to discuss your needs with your instructor no later than fourteen (14) days after the start of this course.