UNIVERSITY OF OREGON
Econometrics: Economics 424/524, Winter 2016.
Tu, Th 10:00 – 11:20am and Fri 12 – 12:50pm in 117 GSH.

Professor George W. Evans. Phone: 541-346-4662. Office: Room 441 PLC. email: gevans “at” uoregon.edu. Office hours: Tu 11:40am – 12:30pm and F 9:30am – 10:20am.

Graduate Teaching Fellow: The GTF is **Kyle Wilson.** Office: Room 323 PLC.
Office hours: M 9-10am and Th 1-2pm. email: kylew “at” uoregon.edu.
Kyle will grade the problem sets, assist in grading the exams, and will be the instructor for most of the Friday classes. On several occasions, Professor Evans will use the Friday class for lecture.

Textbook: The textbook for this course is **William H. Greene**, ***Econometric Analysis***, **7th ed.**, Pearson/Prentice-Hall, 2012. Lecture notes will be made available on Canvas at the conclusion of each topic. Also recommended is James H. Stock and Mark W. Watson, *Introduction to Econometrics*, Third ed., Addison-Wesley, 2011. This book is written at an introductory level, but its econometric sophistication is first-rate.

This course is a continuation of EC 423/523, which provides the probability and statistics prerequisites. Mathematical prerequisites are multivariable calculus (at the level of Math 281-2) and linear algebra (at the level of Math 341). Some knowledge of elementary econometrics will obviously be useful, although not absolutely essential. EC 424/524 presents and illustrates the central techniques of statistical investigation of data that are used in economics. The course provides a serious analytical treatment of the classical regression model and the method of least-squares estimation using a matrix formulation. We carefully develop the statistical properties of least-squares estimation and techniques for inference, and examine the implications and treatment of deviations from the standard assumptions. We will also briefly discuss dynamic regression models and instrumental variable estimators. The Friday 12:00-12:50pm class will mainly discuss the problem sets but will also sometimes be used for lecture.

Exams and Grades. The course grade will be based on problem sets, a closed-book midterm and a closed-book final exam, with weights of 15, 40, and 45 percent, respectively. The midterm will be in class on Tuesday, Feb. 9. The final will be comprehensive, though with greater weight on material from the second half of the course. The final exam is Wednesday, March 16, from 8am to 10am. There will be seven problem sets. The problem sets will include both analytical and computer problems. EC 524 will have some additional problems beyond those assigned for EC 424. Working with other students on problem sets is permitted, but answers must be written up independently.

Computer software, SSIL Lab. The computer software program STATA will be used in this class. An introduction to **STATA** will be given by the GTF, Kyle Wilson, during the **first Friday class**, on January 8. This will take place in the small SSIL computer lab in 445 McKenzie Hall. Computer assignments may be completed in the SSIL lab, which provides computers, software, manuals, and computer assistance. You are not required to use the SSIL lab if you have the means to complete the computer assignments elsewhere (e.g., the TERF room for economics graduate students), but using STATA is expected. It is also possible to buy a student version of STATA from SSIL using Grad Plan.

Topics and Reading

Readings refer to Greene, 7th ed.

1. Introduction. Simple regression. Estimation of bivariate relationships.
   Ch. 1, Ch. 2, lecture notes.

2. The multiple regression model – Part 1. Least Squares. Partitioned regression and the Frisch-Waugh-Lovell theorem. Goodness of fit, R^2.
   Ch. 2, Ch. 3.

3. The multiple regression model – Part 2. Statistical properties of the LS estimator. Gauss-Markov Theorem. Inference: t-tests and confidence intervals. F-tests.
   Ch. 4, pp. 51– 56, 58 – 63 & 75 – 78. Ch. 5, pp. 108 – 127.

4. Model specification – Part 1. Functional form and dummy variables. Structural change. Difference in differences regressions and natural experiments.

5. Model specification – Part 2. Multicollinearity. Omitted and irrelevant variables. Model selection. Control variables and conditional mean independence.
   Ch. 6. Ch. 4, pp. 56 – 58, 89 – 92, 97 – 99. Ch. 5, pp. 134 – 140. Lecture notes.

6. Regression with panel data. The fixed effects model.
   Ch. 11, pp. 343 – 370.

7. Asymptotic theory and its application to the regression problem. Consistency. Asymptotic normality of LS. Asymptotic efficiency. Tests of nonlinear restrictions.
   Ch. 4, pp. 63 – 75. Ch. 5, pp. 127 – 133. Appendix D.

8. Generalized regression model. Properties of LS estimates. Efficient estimation by generalized LS. Heteroscedasticity and autocorrelation. Feasible GLS. Tests for autocorrelation. Robust and clustered standard errors. Newey-West standard errors.
   Ch. 9. Ch. 20, pp. 909 – 912 and 923 – 925.

9. Endogeneity and instrumental variables. Causes of correlation between random disturbance and the regressors. Simultaneity and measurement error. IV estimation and two-stage least squares.
   Ch. 12.

10. Dynamic regression models. Distributed lags and dynamic multipliers (IRFs). Autoregressive distributed lag models.
    Ch. 20, pp. 903 – 930. Lecture notes.