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### ECO 2401S: Ph.D. Econometrics

#### EVALUATION:

Midterm	35%	Wednesday February 16, 2011, 11am-1pm.
Final Exam	35%	Exam period.
Paper	30%	Due date Thursday March 31, 2011

The only generally acceptable reason for missing a term test is illness. A medical certificate is required under such circumstances. We are asked to remind you that plagiarism is a **serious** academic offence with potentially serious penalties.

#### PAPER OUTLINE:

A one page outline of a paper that you will be preparing next semester will be submitted during this course. The outline will contain the following:

1. preliminary model
2. key references (be sure to do a citation search)
3. anticipated results
4. actual numerical data on first observation.

#### Due dates

- **Outline: Friday, January 28, 2011. This is a hard deadline. Late submissions will be penalized.** Please submit the outline electronically as an attachment and name the file using your name. For example, my outline would be “YatchewOutline.doc” or “YatchewOutline.pdf”.
- **Paper: Thursday, March 31, 2011. This is a hard deadline. Late submissions will be penalized.** Please submit the paper electronically as an attachment and name the file using your name. For example, my paper would be “YatchewPaper.pdf”. You must also attach a copy of the computer code (in \*.txt format) used to produce the results in the paper.

Number of Lectures	Subject Matter	References
2	<p align="center"><b>Asymptotic Distribution Theory</b></p> <p>weak and strong convergence, convergence in distribution, <math>O_p</math> and <math>o_p</math> notation, convergence of functions of sequences of random variables, laws of large numbers, central limit theorems, Cramer's Theorem, efficiency vs. asymptotic efficiency and the Cramer-Rao lower bound, Glivenko-Cantelli lemma, uniform law of large numbers, consistency and asymptotic distribution of least squares and maximum likelihood estimators; likelihood ratio, Lagrange multiplier, Wald tests</p>	<p>Greene (4<sup>th</sup> edition) Ch. 4, 9.3,9.4; Greene (5<sup>th</sup> edition) Ch.5.2, Appendices C and D; Greene (6<sup>th</sup> edition) Appendix D, Ch 4.9, 16.4</p> <p>Yatchew, A. <i>Semiparametric Regression for the Applied Econometrician</i>, Cambridge University Press, 2003, Appendix A (available on my website).</p> <p>White, Halbert (1984) <i>Asymptotic Theory for Econometricians</i>, Academic Press, New York, Ch. 1-3</p>
3	<p align="center"><b>Bootstrap Techniques and Theory</b></p> <p>Bootstrap estimates of standard errors, bootstrap based confidence intervals and hypothesis tests.</p> <p>Validity of bootstrap inference, Edgeworth expansions and superiority of bootstrap inference procedures.</p>	<p>Beran R. and G.R. Ducharme (1991): <i>Asymptotic Theory for Bootstrap Methods in Statistics</i>, Centre for Recherche in Mathematiques, Universite de Montreal, Ch. 1,2,4</p> <p>Horowitz, J. "The Bootstrap", <i>Handbook of Econometrics</i>, Vol.5.</p> <p>Horowitz, J. "Bootstrap Methods in Econometrics", in <i>Advances in Economics and Econometrics: Theory and Applications, Seventh World Congress, Volume III</i>, ed. D. Kreps and K. Wallis</p> <p>Hall, P. "Methodology and Theory for the Bootstrap", in <i>Handbook of Econometrics</i>, Vol 4, R. Engle and D. McFadden, eds., 2341-2381</p> <p>Efron, B. and R.J. Tibshirani (1993): <i>An Introduction to the Bootstrap</i>, Chapman &amp; Hall, New York, London.</p>
1	<p align="center"><b>Generalized Least Squares:</b></p> <p>heteroscedasticity, White's HCSE, tests for heteroskedasticity, autocorrelation, moving average models, Newey-West SE, variance components, panel data - time series/cross-section models; mixed estimation, multivariate regression – SUR estimation, random coefficient models</p>	<p>Greene (4<sup>th</sup> edition) Ch. 11.3-11.4,12,13,14,15; Greene (5<sup>th</sup> edition) Ch. 10,11, 12,13,14; Greene (6<sup>th</sup> edition) Ch. 8,9,10, 19.1-19.3.</p>

Number of Lectures	Subject Matter	References
1	<p align="center"><b>Models Where a Right Hand Side Variable is Correlated With the Residual</b></p> <p>instrumental variables, IV estimation as identification via method of moments, 2SLS, errors in variables, simultaneity, Hausman-Wu specification test</p>	Greene (4 <sup>th</sup> edition) Ch. 9.5, 16; Greene (5 <sup>th</sup> edition) Ch. 5.4, 5.6, 15. Greene (6 <sup>th</sup> edition) Ch. 12, 13
4	<p align="center"><b>Introduction to Time Series Analysis</b></p> <p>overview - categorization of models; basic concepts -- stochastic processes, stationarity and invertibility, ergodicity, autocorrelation and partial autocorrelation functions;</p> <p>ARCH and GARCH models;</p> <p>ARMA models - identification, estimation, inference, forecasting. Yule-Walker equations, Wold Decomposition Theorem.; distributed lag models -- Almon lags, Koyck lags; ARMAX models; partial adjustment, dynamic regressions, error correction models, vector autoregressions, seasonal adjustment, spectral density estimation</p> <p>nonstationary models -- trend stationarity, difference stationarity, random walk with/without drift, spurious regressions, ARIMA models, unit roots, tests for unit roots, Dickey Fuller and Augmented D-F tests, Weiner processes; cointegration, testing for cointegration</p>	<p>Davidson and MacKinnon Ch. 19,20. Greene Ch. 17,18. Hamilton Ch. 15-19.</p> <p>Ruud Ch. 25</p> <p>Davidson and MacKinnon p. 556-560. Hamilton Ch. 21.</p> <p>Engle, Robert (1982) "Autoregressive Conditional Heteroscedasticity with Estimates of the Variance of United Kingdom Inflation", <i>Econometrica</i>, 50, 987-1008.</p> <p>Bollerslev, T., R. Engle and D. Nelson (1994) "ARCH Models", in <i>Handbook of Econometrics</i>, vol. 4, ed. R. Engle and D. McFadden, North Holland, 2959-3040.</p>
1	<p align="center"><b>Nonparametric and Semiparametric Regression</b></p> <p>estimation and inference in the partial linear model, tests of specification and equality of regression functions, index models, equivalence scale estimation</p>	<p>Yatchew, A. "Nonparametric Regression Techniques in Economics", <i>Journal of Economic Literature</i>, 1998, 669-721</p> <p>Yatchew, A. <i>Semiparametric Regression for the Applied Econometrician</i>, Cambridge University Press, 2003.</p>