

YORK UNIVERSITY
GRADUATE STUDIES
DEPARTMENT OF ECONOMICS
ECONOMICS 6220
ADVANCED ECONOMETRIC THEORY I

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<http://www.jjstats.com>

Course Description

This graduate course in advanced econometric will be offered in-person. The students are expected to have already taken courses in intermediate econometrics, matrix algebra and calculus. The class will meet at scheduled times on Thursdays at 15:00 in VH 1020. All course materials, including the pre-recorded lectures, are available on E-class, with some materials also posted at <http://www.jjstats.com>.

The objective of the course is to provide the students with a solid theoretical background in time series analysis and introduce a selection of advanced econometric methods for later use in independent applied research. The course covers linear and nonlinear time series models and their estimation methods for applications to macro- and micro-economics and finance. The content of the course includes: Part 1 - properties of univariate stationary processes and the Autoregressive Moving Average (ARMA) models; Part 2 - departures from stationarity, which include unit root processes and the Generalized Autoregressive Conditional Heteroskedastic (GARCH) models; Part 3 - multivariate models, such as the Vector Autoregressive (VAR) model and the Error Correction (ECM) model, causality and cointegration.

The models and their applications will be illustrated by simulations and examples of time series in economics and finance. Additional examples for empirical analysis, simulations and problems will be provided to students in assignments. Suggested software are SAS, R or STATA.

Requirements, Evaluation and Other Details

1. Mid-term exam 30% approximate date of exam: October 26
2. Final exam 50% (date to be determined)
3. Assignments 20% three sets of empirical and theoretical questions available on the website to be handed by October 06, November 10 and December 01.

Course Content

1. Introduction: time series (examples), objectives of time series analysis, model classification

2. Stochastic Processes: difference and lag operators, difference equations and their solutions, stationarity
3. Autocovariance and autocorrelation functions, Wold theorem
4. Conditional mean dynamics: ARMA models, model selection, estimation: Maximum Likelihood, and testing, forecasting, seasonality
5. Nonstationary series: deterministic and stochastic trends, unit root tests, switching regimes, spurious regressions
6. Conditional variance dynamics: GARCH models, applications, Quasi Maximum Likelihood, estimation and testing
7. Multivariate Time Series Models: VAR – estimation: Maximum Likelihood, OLS and tests
8. Causality, exogeneity, impulse response function, variance decomposition
9. Cointegration and common trends
10. Error Correction Models (ECM) - estimation and tests
11. Autoregressive Distributed Lag Model
12. Simulation-Based estimators: SMM and Indirect Inference
13. Non-parametric kernel-based density estimators

Books and Other Reference Materials

Required:

Enders, W., *Applied Econometric Time Series* 3rd or 4th ed., Wiley, 2010 or 2015 (Available on e-class for a 14 day trial)

Lecture notes at www.jjstats.com, E-class and recorded lectures on E-class.

Suggested:

Books:

Martin, V., Hurn, S, Harris, D., *Econometric Modelling with Time Series*, Cambridge University Press 2013

Wei, William W.S., *Time Series Analysis*, Pearson, 2006 (2nd ed.).

[Brockwell, P.J. and R.A. Davis *Introduction to Time series and Forecasting*, 2nd ed., 2002, Springer](#)

[Brockwell, P.J. and R.A. Davis, *Time Series, Theory and Methods* , 2nd ed., Springer-Verlag, 1991.](#)

Gourieroux, C. and A. Monfort, *Time Series and Dynamic Models*, Cambridge University Press, 2002

Early Papers (easy to read) :

Bollerslev, T., R.F. Engle and D.B. Nelson (1993); "ARCH Models," in *Handbook of Econometrics*, Vol. 4.

Campbell, J.Y. and P. Perron, "Pitfalls and Opportunities: What Macroeconomists Should Know about Unit Roots," *NBER Macroeconomics Annual*, 1991, (O.T. Blanchard and S. Fisher, eds.), MIT Press.

Diebold,F.X. and M. Nerlove (1990); " Unit Roots in Economic Time Series," in *Advances in Econometrics* Vol 8, pp 3-69.

Nelson, C.R. and C.J. Plosser (1982), "Trends and Random Walks in Macroeconomic Time Series," *Journal of Monetary Economics* 10, pp. 139-162.

Sims, C.A. (1972), "Money, Income and Causality," *American Economic Review* 62, pp. 540-552.

Sims, C.A. (1980), "Macroeconomics and Reality," *Econometrica* 48, pp. 1-48.

Stock, J.H. and M.W. Watson (1988), "Testing for Common Trends," *JASA* 83, pp. 1097-1107.

Tiao, G.C. and G.E.P Box (1981), "Modelling Multiple Time Series with Applications," *JASA* 76, pp. 802-816.

Course ADD/Drop Deadlines

	Fall Term 2022 (F)	Winter Term 2023(W)
Last date to add a course without permission of instructor (also see Financial Deadlines)	Sept. 20	Jan. 22
Last date to add a course with permission of instructor (also see Financial Deadlines)	Sept. 28	Jan. 31

Last date to drop a course without receiving a grade (also see Financial Deadlines)	Nov. 8	March 11
Course Withdrawal Period (withdraw from a course and receive a grade of “W” on transcript – see note below)	Nov. 9 - Dec. 5	March 12 - Apr. 8

****Policy and Guidelines on Withdrawn from Course:** <http://secretariat-policies.info.yorku.ca/policies/withdrawn-from-course-w-policy-and-guidelines/>

<https://registrar.yorku.ca/enrol/dates/fw19>