NORTH CAROLINA STATE UNIVERSITY
GRADUATE COURSE ACTION FORM

NOTE: Click once on shaded fields to type data. To check boxes, right click at box, click “Properties”, and click “Checked” under Default Values.

DEPARTMENT/PROGRAM: Economics
COURSE PREFIX/NUMBER: ECG (ST) 752
PREVIOUS PREFIX/NUMBER: type previous course prefix/number here
DATE OF LAST ACTION: 9/12/1991
COURSE TITLE: Time Series Econometrics
ABBREVIATED TITLE: TIME SERIES ECONOM
SCHEDULING:
- Fall
- Spring ✓
- Summer
- Every Year ✓
- Alt. Year Odd
- Alt. Year Even
- Other

COURSE OFFERED:
- BY DISTANCE EDUCATION ONLY
- ON CAMPUS ONLY ✓
- BOTH ON CAMPUS AND BY DISTANCE EDUCATION

CREDIT HOURS: 3.0
CONTACT HOURS:
- Lecture/Recitation: 3.0
- Seminar
- Laboratory
- Problem
- Studio
- Independent Study/Research
- Internship/Practicum/Field Work

GRADING:
- ABCDF ✓
- S/U

INSTRUCTOR (NAME/RANK):
Atsushi Inoue, Associate Professor
Graduate Faculty Status: Associate ✓ Full

ANTICIPATED ENROLLMENT:
Per semester: 20
Max. Section: 30
Multiple sections: Yes ✓ No

PREREQUISITE(s):
ECG (ST) 751
COREQUISITE(s):
type course numbers here
PRE/Corequisite for:

RESTRICTIVE STATEMENT:
type BRIEF statement here

CURRICULA/MINORS:
Required
- Either this course or ECG753 is required for economics PhD students
Qualifying Elective
- Economics PhD field course

PROPOSED EFFECTIVE DATE: Spring 2006
APPROVED EFFECTIVE DATE: __________________________

CATALOG DESCRIPTION (limit to 80 words):
The characteristics of macroeconomic and financial time series data. Discussion of stationarity and non-stationarity as they relate to economic time series. Linear models for stationary economic time series: (i) autoregressive moving average (ARMA) models; (ii) vector autoregressive (VAR) models. Linear models for nonstationary data: deterministic and stochastic trends; cointegration. Methods for capturing volatility of financial time series such as autoregressive conditional heteroscedasticity (ARCH) models. Generalized Method of Moments estimation of nonlinear dynamic models.

DOCUMENTATION AS REQUIRED
Please number all document pages

Course Justification
type
Proposed Revision(s) with Justification ✓
Student Learning Objectives
type
Enrollment for Last 5 Years ✓
New Resources Statement
type
Consultation with other Departments
type
Syllabus (Old and New) ✓
Explanation of differences in requirements of dual-level courses
type
RECOMMENDED BY:

Director of Graduate Programs, Economics

Director of Graduate Programs, Statistics

Department Head, ARE

Department Head, Economics

Department Head, Statistics

ENDORSED BY:

Chair, College Graduate Studies Committee, CALS

Chair, College Graduate Studies Committee, COM

Chair, College Graduate Studies Committee, PAMS

College Dean(s), CALS

College Dean(s), COM

College Dean(s), PAMS

APPROVED:

Dean of the Graduate School
Proposed Revisions
ECG 752

**REVISION IN TITLE/ABBREVIATED TITLE:**

**Current Title:** Topics in Econometrics  
**Current Abbreviated Title:** TOPIC ECONOMETRICS

**Proposed Title:** Time Series Econometrics  
**Proposed Abbreviated Title:** TIME SERIES ECONOM

**Justification:** We propose a title change to better reflect the content of the course.

**REVISION IN DESCRIPTION & CONTENT:**

**Current Description:** Survey of current literature on estimation and inference in simultaneous stochastic equations systems. Techniques for combining cross section and time series data including covariance, error correlated and error component models. Lag models and inference in dynamic systems. Production functions, productivity measurement and hypotheses about economic growth. Complete and incomplete prior information in regression analysis. Nonlinear estimation in economic models.

**Proposed Description:** The characteristics of macroeconomic and financial time series data. Discussion of stationarity and non-stationarity as they relate to economic time series. Linear models for stationary economic time series: (i) autoregressive moving average (ARMA) models; (ii) vector autoregressive (VAR) models. Linear models for nonstationary data: deterministic and stochastic trends; cointegration. Methods for capturing volatility of financial time series such as autoregressive conditional heteroscedasticity (ARCH) models. Generalized Method of Moments estimation of nonlinear dynamic models.

**Justification:** The material in ECG (ST) 752 has become to expansive for a one semester course. With the introduction of a new course, ECG (ST) 753, and revision in ECG (ST) 752, the material is divided into two semesters in a natural way. One of the courses, the new one, addresses econometric models for analyzing microeconomic data. The other course, the revised ECG (ST) 752, then treats only econometric models for analyzing macroeconomic and financial data.
# Five-Year Enrollment History

**ECG 752 Topics in Econometrics**  
*(Proposed Title: Time Series Econometrics)*

<table>
<thead>
<tr>
<th></th>
<th>Fall</th>
<th>Spring ECG 752 (ST 752)</th>
<th>Summer</th>
</tr>
</thead>
<tbody>
<tr>
<td>1998-1999</td>
<td>0</td>
<td>16 (0)</td>
<td>0</td>
</tr>
<tr>
<td>1999-2000</td>
<td>0</td>
<td>15 (1)</td>
<td>0</td>
</tr>
<tr>
<td>2000-2001</td>
<td>0</td>
<td>10 (0)</td>
<td>0</td>
</tr>
<tr>
<td>2001-2002</td>
<td>0</td>
<td>14 (0)</td>
<td>0</td>
</tr>
<tr>
<td>2002-2003</td>
<td>0</td>
<td>10 (0)</td>
<td>0</td>
</tr>
<tr>
<td>2003-2004</td>
<td>0</td>
<td>27 (1)</td>
<td>0</td>
</tr>
</tbody>
</table>
OLD SYLLABUS

ECG732 Econometrics II
Syllabus
Spring 2004

Instructor: Alastair Hall

Contact details: Office: 4162 Nelson Hall; phone: 513-2871; email: alastair_hall@muohio.edu

Office hours: 2:30-3:30pm M W or by appointment

Class details: Lectures, 11:20-12:35pm M W in Nelson 1212; Computer labs, 11:20-12:35pm F; Nelson 1411


Course Objectives:

ECG732 is the second of a two course sequence in econometrics for PhD students in economics. The first course, ECG731, covers statistical methods relevant for the analysis of cross-sectional data. ECG 732 covers statistical methods for the analysis of time series and panel data.

Time series analysis is an important branch of statistical theory with applications in diverse fields. In economics, most macroeconomic and financial data are time series. Over the last twenty years, there has been a growing recognition that the analysis of economic time series raise a number of unique inference issues. This has led to the emergence of the field of time series econometrics that includes such techniques as vector autoregressions, impulse response functions, autoregressive conditional heteroskedasticity (ARCH) models, tests for unit roots against various deterministic trend models, and cointegration.

Another important branch of econometrics involves methods for the analysis of panel data. Such data sets involve observations on individuals over time, and so its analysis involves a synthesis of cross-sectional and time series analysis and also unique aspects that arise through the combination of these two dimensions.
Presentation of material:

As noted above, the lectures take place on Mondays and Wednesdays between 11:20am and 12:35pm. The SAS related material is covered exclusively during sessions in the computer lab (Nelson B411) that are held on Fridays between 11:20am and 1:00pm. These labs run most, but probably not all, weeks. You will be advised of the schedule in the lectures.

Course Requirements and Grading

The lectures assume the student has taken ECON 751. Any student without this prerequisite must obtain the permission of the instructor to attend the class.

The material is divided up into three blocks. Your grade for each block will be calculated as follows. There is one computer assignment which counts 15%, one set of analytical problems which counts for 15%, and one exam which accounts for 70%. The course grade is based on the aggregate of your marks from each block.

The exam dates are as follows: Block 1, February 23 (week 7); Block 2, March 29 (week 12); Block 3, May 3 (final exam slot).

Course Outline:

1. The Linear Model regression model with time series data
   (a) Fixed regressors
      • Time trends and asymptotically uncooperative regressors; Greene pp. 67-8.
      • Serially correlated errors; Greene Ch 12.
   (b) Stochastic regressors; Greene Ch 12.
2. Linear univariate time series models: ARMA models; Greene Ch 20.1-20.2.
3. Linear multivariate time series models: VAR models, exogeneity, Granger causality, impulse response; Greene Ch 19.6.
4. Autoregressive conditional heteroscedasticity (ARCH) models; Greene 11.8.
5. Nonstationary time series models: unit roots and cointegration; Greene Ch 20.4.
6. Panel data models: fixed and random effects; Ch 13.
7. Generalized Method of Moments; Ch 18.
NEW SYLLABUS
Syllabus for ECG 752
TIME SERIES ECONOMETRICS
SPRING 2006

1. Instructor: Dr. Alastair R. Hall Office: 4162 Nelson Hall
   Campus Box 8110
   Raleigh, NC 27695
   Office Hours: 2:30-3:30pm Mon Wed or by appointment.
   Phone Number: (919) 513-2871
   Fax: (919) 515-5613
   E-mail address: alastair_hall@ncsu.edu

2. Course Prerequisites: An advanced course in econometrics (ECG751).

3. Course Description:
   This is an advanced graduate course exploring econometric techniques for the analysis of
   macroeconomic and financial time series data. The course provides a rigorous treatment of the statistical
   properties of these techniques and also discussion of important practical issues in their implementation.

4. Course Objectives:
   The student is expected to achieve an understanding of econometric models for analyzing time series
   data in preparation for applications in economics. The student will learn linear models for stationary
   economic time series: (i) autoregressive moving average (ARMA) models; (ii) vector autoregressive
   (VAR) models. In nonstationary data models the student will learn about deterministic and stochastic
   trends and cointegration, and will learn methods for capturing volatility of financial and time series such
   as autoregressive conditional heteroscedasticity (ARCH) models. Finally the student will learn
   Generalized Method of Moments estimation of nonlinear dynamic models.

5. Learning Outcomes: The student will demonstrate understanding in this area of econometrics at an
advanced graduate level.

6. Student assessment: By grading and editing homework, midterms, and a final exam.

7. Textbooks:
   For prices, call NCSU bookstore at 919-515-2161

8. Topics and estimated days allocated to each topic:
   Weeks 1 - 7: Linear models for stationary economic time series:
   --Characteristics of economic time series
   --Introduction to basic time series concepts
–Large sample theory for covariance stationary processes
–Linear univariate time series models: VAR models, exogeneity, Granger causality, impulse response
–Linear regression model with time series data: GLS, OLS with robust standard errors

Weeks 8 - 9: Modelling volatility of financial time series
–Autoregressive conditional heteroscedasticity (ARCH) models

Weeks 10 - 13: Linear models for nonstationary data:
–Deterministic and stochastic trends
–Cointegration

Weeks 14 -15: Nonlinear dynamic models
–Generalized Method of Moments estimation

9. Tentative schedule of homework due dates, quizzes and tests
The material is divided into several blocks. Within each block there will be a computer assignments, analytic problems and a midterm exam.

10. Determination of grades: + and - system
Homeworks: These are either computer assignments or analytic problems.

Attendance: NA
Tests: Two mid term exams. Each problem is graded on a 10 point scale. The grade will be the sum of these scores normalized to 100.
Final Exam: Cumulative, 3 hour proctored final exam.
The computer assignments and analytic problems are each weighted 15 percent. The two mid terms are each weighted 20 percent, and the final exam is weighted 30 percent of the final grade. The conversion from this numerical grade to a letter grade is based on the standard plus-minus ten point grading.

11. Policy on incomplete grades and late assignments:
There is no fixed policy. Each case must be discussed with the instructor. However we will adhere as closely as possible to University standards as outlined in the Handbook of Advising and Teaching.

12. Policy on absences (excused and unexcused) and scheduling makeup work:
There is no fixed policy. Each case must be discussed with the instructor. However we will adhere as closely as possible to University standards as outlined in the Handbook of Advising and Teaching.

13. Academic Integrity Statement:
Students are expected to follow university guidelines available at http://www.ncsu.edu/provost/academic_regulations/integrity/reg.htm (link)

14. NC State policy on working with students with disabilities:
You must contact the NCSU Disability Services for Students DSS located in Suite 1900 of the Student Health Center. Information can be found at http://www.ncsu.edu/provost/offices/affirm_action/dss/,
Further Information:

NCSU Academic Regulations can be found at
http://www2.ncsu.edu/unity/project/www/ncsu/provost/info/academic_policies/ (link)