CJ 7350A Forecasting, Trend Analysis & Data Interpretation
Section 001
Class Wed. 6:30-9:20
Classroom Hines 201

Dr. M. Chamlin
Office: Hill House 109
Office hrs. Wed. 5:30 - 6:30,
by appointment, & any time that
I am in my office

Fall Semester 2013

Course Objectives: The purpose of this course is to teach you how to conduct longitudinal data analysis. The primary focus will be on Autoregressive Moving Intergrated Moving Average (ARIMA) modeling techniques. Specifically, we use ARIMA procedures, and the RATS statistical package, to: 1) build univariate ARIMA, 2) build noise and transfer function ARIMA models to assess the impact of ongoing natural experiments (interrupted time series analysis) on outcome series, and, if time allows, 3) forecast time series data

Text: Interrupted Time Series Analysis, McDowall et al. (1980)

Note: 1) All electronic devises must be turned off and placed out of sight before entering the classroom. This may seem a bit strange to you. Unfortunately, I have some recurrent problems with students inappropriately using cell phones and computers during my lectures. I take this matter very seriously. **Please respect my wishes with regard to this matter**. Failure to adhere to this policy will lead to a reduction in your final grade or **outright failure in the course**.

2) **Attendance** policy**.** Attendance is required. Exceptions will be made, at my discretion, for truly extraordinary circumstances. Missing class because your employer decides that s/he wants you to work late is **not** an extraordinary circumstance.

3) **Lateness** policy: Coming to class late is very disruptive. Therefore, I have decided upon the following policy. If you are planning to come late, you need to let me know in advance. Otherwise, you must be in class by 6:40 PM (no more than 10 minutes late) or you will be asked to leave. If you refuse to leave, I reserve the right to lower your final grade by one letter grade each time you come late and refuse to leave.

3) **Grading.** This is course is an elective statistics course. It should not be necessary to use grades to motivate you to do work sufficiently hard to grasp the material. Therefore, I decided to allocate final grades in the following manner.

a) To earn a **B** you will need to adhere to my attendance and lateness policies and show some evidence of being prepared (e.g., correctly answering questions in class).

b) To earn an **A** you will need to meet the requirements for a B **and** write a short (5-10 page) paper that critically evaluates a criminal justice-related article that uses interrupted time series procedures.

Before beginning the paper you will need to get my approval of the article and have, at a minimum, one meeting with me so I can make sure you are on the right track with respect to the assignment.

c) You must notify me by October 1, 2013 that you will be attempting to earn an **A**. After this date you can only attempt to earn a **B**.

4) My office phone number is 245-6503. My e-mail address is mitch.chamlin@txstate.edu. Contact me whenever you like, but do not call me at home.

5) All readings should be done before coming to class. Failure to read the assignments in a timely fashion will probably adversely affect your final grade.

6) The last day to drop this class without special permission from the University Administration is 5 PM October 24th.

7) Any student requesting special consideration with respect to the use of electronic devices in class or other special needs must register with the appropriate University authorities and confirm all arrangements with me within ***the first two weeks of the quarter-absolutely no exceptions!***

8) All Handouts are in the **resources** section of TRACS.

Outline: This schedule is **subject to change**, depending on how quickly we move through the material.

August 28th: Introduction to the course or why bother with time series analysis anyway?

September 4th: Causality I: The problem: selectivity bias, functional form

Freedman, David A. (1991). Statistical Models and Shoe Leather." *Sociological Methodology* 21:291-313.

Lieberson, S. (1985). *Making it Count.* Chapter 2: Selectivity, pp.14-43.

Lieberson, S. (1985). *Making it Count.* Chapter 4: Assymetric forms of causality, pp. 63-87.

September 11th: Causality II: Possible solutions

Blalock, H. M. (1991). "Are There Really Constructive Alternatives to Causal-Modeling?" *Sociological Methodology* 21:325-335.

Chamlin and Cochran (1998). Causality, Economic Conditions, and Burglary." *Criminology* 36:425-439.

Granger, C.W.J. (1980). "Testing for Causality: A Personal Viewpoint." *Journal of Economic Dynamics* and Control 2:329-352.

September 25th: Univariate ARIMA modeling; Introduction to RATS

1) Chamlin notes on univariate ARIMA models: see TRACS

2) Begin reading McDowall et al. (1980), chapters 1 & 2

October 2nd: Seasonality; Building Univariate ARIMA modeling, more fun with RATS

1) Continue reading the handout on Univariate Models

2) Continue reading McDowall et al. (1980), chapter 2

October 9th: Autocorrelation Function, Partial Autocorrelation Function, related diagnostics, and yet more fun with RATS

1) Continue reading McDowall et al. (1980) chapter 2

2) Stier (1989) "Basic Concepts and New Methods of Time Series in Historical Social Research." *Historical Social Research* 14:3-24.

3) RATS handouts: univariate models -AZ armed robberies; AZ strong armed robberies

October 16th: Practical experiences with univariate model building

1) More handouts: RATS output: univariate models - AZ total robberies

October 23rd: More practical experiences with univariate model building; Interrupted Time Series Analysis

1) Begin reading McDowall et al. (1980) chapter 3

2) More handouts: RATS output: univariate models - AZ homicide & suicide

October 30th: Practical experiences with transfer function (interrupted time series) models

1) Continue reading McDowall et al. (1980) chapter

2) More handouts: RATS output: intervention models - AZ armed robberies; AZ strong armed robberies; AZ total robberies

3) Singer and McDowall (1988). "Criminalizing Delinquency: The Deterrent Effects of the New York Juvenile Offender Law." *Law & Society* 22(3):521-536.

4) Novak et al. (1999). "The Effects of Aggressive Policing of Disorder on Serious Crime." *Policing* 22(2):171-190.

November 6th: Interrupted time series analysis - continued (practice, practice, practice)

1) More handouts: RATS output: intervention models - AZ homicides & AZ suicides

2) Chamlin and Scott (forthcoming). "Extending the Hours of Operation of Alcohol Serving Establishments." *Criminal Justice Policy Review.*

November 13th: Subtleties of Interrupted Time Series Analysis

1) Chamlin (2008). "Threat to Whom? Conflict, Consensus, and Social Control." *Deviant Behavior* 30:539-559.

2) Land and McCleary (1996)."Missing Time-Series Data and the Impact of Sentencing Guidelines in Minnesota: Can the Debate be Adjudicated? *Criminology* 34(2):281-288.

3) Thome (1995). "A Box-Jenkins Approach to Modeling Outliers in Time Series Analysis." *Sociological Methods & Research* 23(4):442-478.

November 20th: **No Class - ASC meetings**

November 27th: **No Class - Thanksgiving**

December 4th: Forecasting with ARIMA models

1) Lin et al. (1986). "Using ARIMA Models to Predict Prison Populations." *Journal of Quantitative Criminology, 2,* 251-264.

2) Shrivastav and Ekata (2012). "Applicability of Box Jenkins ARIMA Model in Crime Forecating: A Case Study of Counterfeiting in Gujarat State." *International Journal of Advanced Research in Computer Engineering & Technology* 1(4):494-497.

2) Handouts: ARIMA Forecasting with RATS: AZ suicides; FARS total crashes; FARS fatal crashes.