STATISTICS 479/503 - TIME SERIES ANALYSIS
Course Information

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Lectures: TR 9:30 - 10:50 CAB 457
Office hours: whenever I'm in my office, or by appointment

Required text

Time Series Analysis and Its Applications, with R examples; R. H. Shumway and D. S. Stoffer.

A downloadable version of this text has been made available by the authors and is available on their website and on the course website.

Prerequisite material, computing

Students will be expected to be familiar with the techniques of calculus and linear algebra, and to have had some exposure to linear regression (e.g. STAT 252 or 378) and to mathematical statistics (e.g. STAT 372). Experience with the use of statistical packages will be helpful, but not necessary - this experience will be acquired in the course.

For the computing we will use R, which is a statistical and numerical computing package developed and supplied, free of charge, by members of the statistical research community. It, together with a manual and the data sets used in the text, can be downloaded from the course web site. This site is reached by starting at

www.stat.ualberta.ca/˜wiens/

and then navigating to the teaching links. This site also contains the lecture notes, assignments, sample exams, graphical displays to be discussed in class, samples of R code, etc.

Look at this site soon and regularly.

R will be loaded onto the computers in CAB 331, 335, 341 and 345; it is however small enough that you can put it on a memory stick and use it anywhere.

The 'intro to R' on the course web site should be helpful to you. You should work through this right away, if you have no previous experience with R.

Assessment

Assignments:	40% (Three: 10% + 15% + 15%)
	See Note 3 on Assignment 1 for a possible 2% bonus.
Exams:	40% (Three: 10% + 15% + 15%. Closed book, no notes.)
Project:	20%

Implementing the grading system

At the end of term I will have a record of each student's raw grades for all assignments, projects and exams. I will then compute a term results summary based on these raw grades, and rank everyone in order of merit. After deciding whether the class as a whole is average, above average or below average, I shall determine what percentage of the class should fall into each of the possible grades, and assign the grades accordingly. These grades will reflect my judgements, which will be based on my assessments of both absolute achievement and relative performance in the class.

There is no pre-determined algorithm for converting raw scores to grades. In the past, the relationship between STAT 479 numerical scores and letter grades has been approximately:

A	B	C	D	F
85-100	70-85	55-70	50-55	0-50

Active participation in classroom discussions, including asking and answering questions, is expected of all students. The extent to which this has been achieved will be considered when scores are converted to grades.

Graduate students who are taking this course for graduate credit as STAT 503: Directed Study III will be graded separately from the STAT 479 students, and will each give a seminar presentation - see the 'Project' section below.

There is another benefit to class participation, beyond its intrinsic value. I am regularly asked to write letters on behalf of students who are applying for awards, or for admission to further study. If I have had no interaction with you, I can report only your grade, and that beyond that I know nothing about you. Such a letter will surely not be very helpful.

Assignments

Assignments should be submitted before the beginning of class, on the announced due date. See the tentative course outline which follows. There are only three assignments, and you may find them long.

Do not expect to be able to do an assignment in the few days before it is due.

It is very important that you start each assignment as soon as possible after the previous one has been submitted. I am always happy to preview your work with you, so as to comment on its correctness, and point out ways in which it might be improved. (But leave time for this!)

The assignments will be marked by a graduate student who may not be as familiar as you with exactly what has gone on in class. Thus, you must be careful to include a sufficient amount of explanation about your work, so that the marker does not have to guess what you mean. The marker will want to see that you understand what you are writing, not merely that you arrive at the correct answer.

YOU ARE EXPECTED TO WRITE UP YOUR OWN WORK IN YOUR OWN WORDS, using full sentences and proper English grammar. Copying the ideas or words of another is plagiarism, and is a serious offence.

Project

Each student will submit a project, in which one or more time series from the scientific (or economic, etc.) literature is analyzed. Do not use any of the series analyzed in the textbook. You should start with a description of the series, using the methods of Chapters 1 and 2 of the text. You should go on to include both a time domain analysis and a frequency domain analysis, as in Chapters 3 and 4 of the text. An implication of this is that *you can, and should, start on the project almost immediately and continue thinking about it throughout the term.* You will chose the particular features to be addressed in your analysis. There will probably be sufficient scope to apply a variety of techniques from this course if you choose two related time series, with observations made in the same, equally spaced, time periods.

Links to some useful compilations of time series datasets are on the course web page.

Your report should be typed. It should contain, as well as the detailed analysis, a description of the scientific questions underlying the collection of these data, the reasons why you chose the particular approach that you did, and an explanation of how your analysis helps address the scientific questions involved. *Examples of some projects submitted in previous years are on the course web page.*

- STAT 503 students should try to find datasets related to their graduate research. One or more special classes will be established towards the end of term, in which you will present your analyses in a seminar setting. Five of the twenty percent of the grade allotted to the project will be determined on the basis of the seminar presentation.

General comments

This is a senior course in which statistical theory and practice are blended at a relatively high level. Students typically find it difficult, and the success rate can be somewhat low. Some possibly helpful tips:

- Rewrite your notes as soon as possible after each lecture. Writing up material in one's own words is the best way to see if the material has been understood. *Although lecture notes are available to be downloaded, they should be treated as an outline of the material, not as the complete story.* You will want to augment them with notes of your own, compiled during the lectures and rewritten afterwards.

- If you find that you don't understand what has gone on in class, *ask or see me right away.* Don't start drifting from one lecture to another, understanding less each time.

- On assignments: Don't hand in your rough work! Do the assignment and then rewrite it, neatly, with an adequate amount of clear explanation. *The rewriting stage is the most important one for finding errors in one's work, and for deepening one's understanding of it.*

PLEASE FILL OUT THIS PAGE AND RETURN IT TO ME

NAME:

DEGREE PROGRAM:

AREA OF SPECIALIZATION:

Please list the STAT and MATH courses you have previously taken. Include the names or topics of the courses, if they were not taken here.

Please list the STAT and MATH courses you are taking this year.

Why are you taking this course?