STA 137—Applied Time Series Analysis FQ 2017

Classes: Monday, Wednesday, Friday 9:00–9:50am, WELLMN 234

Discussion A01: Monday, 5:10–6:00 pm, WELLMN 119
Discussion A02: Tuesday, 5:10–6:00 pm, OLSON 205

Lab Session: TBA
You can view the Lab Session as extended office hours, attendance is optional but might be useful.

Instructor:

Alexander Aue, aaue@ucdavis.edu, 530.554.1555, MSB 4230, office hours by appointment

Teaching Assistant:

Ozan Sönmez, osonmez@ucdavis.edu, MSB 1117, office hours TBA

Lecture Notes:

Will be distributed chapter-wise in advance. Please check carefully for typos and mistakes and submit a list of what you found for potential extra credit. The notes will be updated continuously with your input.

Optional Textbooks:

Brockwell/Davis, *Introduction to Time Series and Forecasting (2nd ed.)*, Springer, 2002.
Cowpertwait/Metcalfe, *Introductory Time Series with R*, Springer, 2009.
Shumway/Stoffer, *Time Series Analysis and Its Applications (3rd ed.)*, Springer, 2011.

Note that the second and third book are available as pdf files from the library website.

Prerequisite:

STA 108, or the equivalent.

Note that STA 130A or STA 131A have proved useful in the past but are not required.

Homework:

Will typically be given out after each class. Homework can consist of reading assignments and/or problem solving, the latter both theoretical and computational (coding in R).

Note that you will not turn in your homework solutions.

Exams:

Two midterm exams: October 20 & November 15; one final exam: December 11, 8:00-10:00 am

Please bring a UCD 2000 scantron to the exams. Some of the questions may be multiple choice.

Project:

Will be given out towards the middle of the quarter and submitted by the end of Week 9.

Grading Policy:

Grades will be computed according to the following arrangements

Midterm exams: 25% each Final exam: 30% Project: 20% of final grade

A: between 90 and 100% (the A range will not be curved)
B: between class median and 89% (above average performance gives above average grade)
C: between class median minus 1.5 standard deviations and class median
D: between class median minus 2.0 standard deviations and class median minus 1.5 standard deviations
F: less than class median minus 2.0 standard deviations

Note that no individual letter grades will be given for midterm/final exams and project. Your letter grade for the course will be based on your overall score. The usual conventions apply regarding the use of "+" and "−".

Topics (tentative):

- Decomposition of time series into trend, seasonality and dependent errors
- Modeling of dependent errors: stationarity, linear time series, ARMA processes
- Estimation and prediction of stationary time series
- Spectral analysis: cyclical behavior, periodicity and periodogram

---

Learning Outcomes:

Students taking STA 137 should learn the basics of

- statistical reasoning and inferential methods for dependent data
- time series analysis in the time and frequency domain
- interpreting and communicating the results of a statistical analysis for time series
- performing data analysis for time series using statistical computing tools and software
- the methodological and probabilistic foundations of statistics for dependent data

---

Academic Integrity:

Instructor, TA's and students are responsible for the academic integrity in class. Existing policies forbid cheating on examinations, plagiarism and other forms of academic dishonesty. Academic dishonesty is contrary to the purposes of the University and is not to be tolerated. A code of conduct for the campus community must exist in order to support high standards of behavior. Under the Code of Academic Conduct, adopted in 1976, students, faculty, and administration share responsibility for academic integrity at UC Davis. The Code requires students to act fairly and honestly, and is based on a student honor code established in 1911. Details can be found at the URL `http://sja.ucdavis.edu/cac.html`.