STAT:7560 (22S:235) Time Series Analysis
Fall, 2015

1. Instructor: Kung-Sik Chan SH 263 335-2849 `kung-sik-chan@uiowa.edu`

   office hours: MWF 1:00–2:00pm, or by appointment.

2. Department: Statistics and Actuarial Science
   DEO contact information (Joseph Lang, 241 SH, 335-0712, `joseph-lang@uiowa.edu`)

3. Time and location of class: 11:30am - 12:20am MWF 30 SH

4. Textbooks:
   Non-linear Time Series, A Dynamical System Approach. By Howell Tong (1990).
   Time Series Analysis with Applications in R. By Jonathan Cryer and Kung-Sik Chan (2008).

   We aim to cover the following topics in Chapters 1-7 of Tong (1990) and Chapters 11, 12 and 15 in Cryer and Chan (2008). Dynamical systems defined by nonlinear differential equations and difference equations: limit cycles, amplitude-frequency dependence, Volterra series and bilinear systems, chaos, stability. Some parametric nonlinear time series models: threshold models, ARCH models, etc. Probabilistic structures of nonlinear time series models: ergodicity, stationarity, mixing, time reversibility, and nonlinear representation. Statistical inference: test for linearity, model selection, estimation and model diagnostics. Nonlinear prediction.

5. Prerequisite: 22S:156 Applied Time Series Analysis, or equivalent. 22S: 153 and 154 or equivalent

6. Course requirements:

	date	percent
Homework		15%
Exam 1	Oct, 9 (Friday)	30%
Exam 2	Dec, 4 (Friday)	30%
Project report	(to be announced)	25%

   Several homework assignments will be given. Discussion with fellow students on the exercises of the homework is allowed. Exams are open book. Each student has to do a project with some time series data, and present the analysis during the final exam date to be announced. A one-page proposal outlining the scientific questions to be addressed and the relevant techniques to be employed, with a separate listing of the data, has to be handed in during class on Nov 20. The final written report should be typed and include a one-page non-technical summary of the findings,

followed by the background of the scientific questions, the body of technical analyses with interpretations, a conclusion and the listing of the data. Including graphics, the report ordinarily should not exceed 15 pages in length.

7. Computer package. We shall the freeware R for doing computations and model fitting. R can be freely downloaded at `http://lib.stat.cmu.edu/R/CRAN/`

8. Grading policy: Your grade for this course will be assigned according to the following *approximate* scale:

85	to	100	A
75	to	84	B
65	to	74	C
55	to	64	D
0	to	54	F

This scale is not absolute, and the cutoff points may vary depending on the difficulty of the exams. Also, borderline cases may receive a + or −. The College and EPC ask that the A+ grade be used only in extraordinary situations.

9. Students are expected to attend every class unless for documented reasons including sickness or unavoidable circumstances. See `http://www.clas.uiowa.edu/faculty/teaching/attendance.shtml` for the CLAS policies on attendance.

10. Miscellaneous:

Administrative Home The College of Liberal Arts and Sciences is the administrative home of this course and governs matters such as the add/drop deadlines, the second-grade-only option, and other related issues. Different colleges may have different policies. Questions may be addressed to 120 Schaeffer Hall, or see the CLAS Student Academic Handbook.

Electronic Communication University policy specifies that students are responsible for all official correspondences sent to their University of Iowa e-mail address (@uiowa.edu). Faculty and students should use this account for correspondences. (Operations Manual, III.15.2. Scroll down to k.11.)

Accommodations for Disabilities A student seeking academic accommodations should first register with Student Disability Services and then meet privately with the course instructor to make particular arrangements. See www.uiowa.edu/ sds/ for more information.

Academic Honesty The College of Liberal Arts and Sciences expects all students to do their own work, as stated in the CLAS Code of Academic Honesty. Instructors fail any assignment that shows evidence of plagiarism or other forms of cheating, also reporting the

student's name to the College. A student reported to the College for cheating is placed on disciplinary probation; a student reported twice is suspended or expelled.

CLAS Final Examination Policies Final exams may be offered only during finals week. No exams of any kind are allowed during the last week of classes. Students should not ask their instructor to reschedule a final exam since the College does not permit rescheduling of a final exam once the semester has begun. Questions should be addressed to the Associate Dean for Undergraduate Programs and Curriculum.

Making a Suggestion or a Complaint Students with a suggestion or complaint should first visit the instructor, then the course supervisor, and then the departmental DEO. Complaints must be made within six months of the incident. See the CLAS Student Academic Handbook.

Understanding Sexual Harassment Sexual harassment subverts the mission of the University and threatens the well-being of students, faculty, and staff. All members of the UI community have a responsibility to uphold this mission and to contribute to a safe environment that enhances learning. Incidents of sexual harassment should be reported immediately. See the UI Comprehensive Guide on Sexual Harassment for assistance, definitions, and the full University policy.

Reacting Safely to Severe Weather In severe weather, class members should seek appropriate shelter immediately, leaving the classroom if necessary. The class will continue if possible when the event is over. For more information on Hawk Alert and the siren warning system, visit the Public Safety web site.