STAT 574E Spring 2008

Environmental Statistics

Text:
- *Analyzing Environmental Data*, by Walter W. Piegorsch & A. John Bailer (John Wiley & Sons, 2005).
- (optional) *The Little SAS Book: A Primer*, 3rd Edn. by Lora Delwiche and Susan Slaughter (SAS Institute Inc. Press, 2003).

Course Web Site: http://stat.arizona.edu/STAT574E.spring08.php

Instructor: Professor Walter Piegorsch, south office: 835 Gould-Simpson (phone in north office: 621-2357).

Office Hours: T Th 12:30 – 1:45 pm
or by appointment.

(Feel free to check if I am in my office at other times. If not attending to other duties, I will be happy to discuss classroom issues. Also, messages may be left with the Mathematics Department staff in 108 Math Bldg.)

Attendance: Students are expected to attend class. If important circumstances prevent this, it is the student's responsibility to find out what was covered in class, what was assigned for reading or homework, and what special announcements (if any) were made. "Excessive absence" in this class will be construed to be absence from more than 10 percent of the scheduled class sessions, whether excused or unexcused, and will be subject to Administrative Drop as per University policies.

Grading:

Exam 1	Tuesday, February 26	100 points
Exam 2	Tuesday, April 8	100 points
Final Exam (Comprehensive)	Tuesday, May 13 (2:00 – 4:00 pm)	100 points
Total		300 points

A = 275–300
B = 245–269
C = 215–244
D = 195–214
E = 0–194

Homework: Required. Due as assigned. No exceptions. Graded ✓ or ✘.

Make-Up Exams: Considered only for Exams 1 and 2: given only in dire circumstances, only if identified *in advance*, and only during the week following the scheduled exam.

The regulations in the Student Code of Conduct and Code of Academic Integrity prohibit all forms of student academic dishonesty, including but not limited to cheating, fabrication, and plagiarism. Violations can result in serious penalties, including expulsion from the University. Information on these Codes is available at http://dos.web.arizona.edu/uapolicies/. It is assumed that all students are familiar with and will abide by these Codes.

Note: the Student Code of Conduct (5-308.F.11) dictates that no person or organization may interfere with University-sponsored classroom activities. This policy will be enforced as necessary.

GENERAL ADVICE:
- *Read* the sections of the text to be covered prior to the class session.
- *Attend* class regularly. *Arrive* on time.
- *Ask* questions if you don't understand an issue. (See me after class if time is short.)
- *Attempt* to do all assigned homework. (See me during Office Hours if encountering difficulty.)

Course Syllabus for STAT 574E/MATH 574E/CPH 574E

January 2008

Description: Environmental Statistics (3 units) – Statistical methods for environmental and ecological sciences, including nonlinear regression, generalized linear models, temporal analyses, spatial analyses/kriging, quantitative risk assessment.

Prerequisite(s): STAT 571B/MATH 571B, or PSYC 507C, or equivalent.

Purpose of Course: To provide a course of study in data analytic methods for problems in the environmental sciences to intermediate graduate students in ecology, engineering, geology, geography, public health, pharmacology, toxicology, and associated disciplines, and to graduate students in statistics and biostatistics. To provide a foundation for application of environmetric models and methods in future scientific research and policy-driven investigations.

Current Textbook: Piegorsch, W. W., and Bailer, A. J. (2005). *Analyzing Environmental Data*. Chichester: John Wiley & Sons.

Topics:	**Book Sections**	**Time**
Statistical Models & Model Fitting Distributions; parameter estimation; Least squares, non-linear least squares; maximum likelihood	A.1, A.3-A.4	1 week
Review of Linear Regression and ANOVA Simple & multiple linear regression One- & two-factor ANOVA; polynomial regression	1.1-1.3, 1.5	1.5 weeks
Nonlinear Environmetric Response Models Threshold & truncated models; growth curves; rational polynomials	2.1-2.5	2 weeks
Generalized Linear Models Logistic regression; log-linear models & other generalized linear models	3.1-3.2.4, 3.3.2, 3.3.4	2.5 weeks
Inference for Temporal Data Time series; harmonic regression; Fourier analysis; AR models; trend & intervention analysis	5.1-5.5	3 weeks
Inference for Spatial Data Spatial point patterns; spatial autocorrelation; variograms and kriging	6.1-6.4	4 weeks
Quantitative Risk Assessment Potency estimators; median effective dose; risk estimation; low-dose extrapolation/benchmark analysis	4.1-4.3	1 week
		15 weeks

Notes: Computer applications in SAS and other packages will be integral to regularly assigned Homework.