

# APPLIED ENVIRONMENTAL STATISTICS

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Sacramento, CA

## DAY 1

Introduction	8:00 a.m.
Describing Data (Chap. 1) & Graphical Data Analysis (Chap. 2) characteristics of environmental data from samples to populations dealing with outliers, transformations why use graphics boxplots, quantile plots, probability or Q-Q plots PROBLEM: describing data	8:30 a.m.
General Hypothesis Testing (Chapter 4) 5 categories of hypothesis tests $\alpha$ levels and p-values 1-sided and 2-sided tests exact test vs. large-sample approximations	11:00 a.m.
LUNCH 12:00 - 1:00 p.m.	
PROBLEM: how hypothesis tests work	1:00 p.m.
Statistical intervals (Chapter 3) Coping with uncertainty Confidence intervals, skewed data ? PROBLEM: Intervals and transforms	1:30 p.m.
Some other intervals prediction, tolerance, how to compute PROBLEM; the three intervals	2:30 p.m.
FINISHED 4:30 p.m.	

## DAY 2

Comparing Two Groups of Data (Chapters 5 & 6) Two paired groups Example & exercise Have standards been met? Exercise Quantile test & Exercise Two unpaired (independent) groups PROBLEM: testing for significant differences Different by how much?	8:30 a.m.
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**DAY 2 cont.**

Sample size & power curves	10:30 a.m.
LUNCH 12:00 - 1:00 p.m.	
Comparing More Than Two Groups of Data (Chapter 7) one- and two-factor ANOVA non-parametric alternatives multiple comparison tests: who's different? PROBLEM: parametric and nonparametric tests	1:00 p.m.
Testing differences in Variability Characterizing differences in variability Levene's & Squared Ranks tests PROBLEM: variability of concentrations	3:30 p. m.
FINISHED 4:30 p.m.	

**DAY 3**

Correlation Review (Chapter 8) Patterns of association with indicators PROBLEM: Three correlation coefficients Kendall's linear model PROBLEM: Kendall slope estimator	8:30 a.m.
Linear Regression (Chapter 9) Building a good regression model determining improvements over background noise PROBLEM: modeling environmental quality hypothesis tests, confidence and prediction intervals	9:30 a.m.
LUNCH 12:00 - 1:00 p.m.	
PROBLEM: estimating total flux	1:00 p.m.
Multiple Regression (Chapter 11) measures of a good model plot the data ! multi-collinearity model selection: surpassing stepwise PROBLEM: estimating urban non-point loads	1:45 p.m.
FINISHED 4:30 p.m.	

#### DAY 4

Analysis of Covariance (Chapter 11) Discrete explanations PROBLEM: how many regression lines are needed?	8:30 a.m.
Trend Analysis (Chapter 12) selecting a trend test: regression vs. Mann-Kendall approaches removing exogenous effects monotonic vs. step trends PROBLEM: Four approaches to trend tests censored data dealing with seasonality	10:00 a.m.
LUNCH 12:00 - 1:00 p.m.	
PROBLEM: A trend for all seasons?	1:00 p.m.
FINAL EXAM PROBLEM	2:00 p.m.
Class Discussion and Applications	3:30 p.m.
FINISHED 4:30 p.m.	

#### DAY 5

Making Sense of Nondetects	8:00 a.m.
Contingency Tables (Chapter 14) PROBLEM: Is uranium OK?	9:30 a.m.
Logistic Regression (Chapter 15) PROBLEM: Estimating probabilities	10:15 a.m.
Wrap-up	11:45 a.m.
FINISHED 12:00 noon	