ENVS 220 – Applied Environmental Analysis

Condensed Syllabus

Description

The analysis of quantitative data remains essential for addressing a wide range of local and national environmental issues. Data can be used to monitor resources, track changes over time, and advocate for policy and behavioral change. In this course, we will explore the processes used to understand, analyze, and solve environmental problems through a quantitative lens. Students will be introduced to mathematical and statistical concepts, along with statistical software tools like R and STELLA.

Logistics

- Lecture: One ~1.5 hours session per week
- Practical: One ~1.5 hours session per week

Materials

No required textbooks. Course is based on:

- Reimann C., Filzmoser P., Garrett R., Dutter R. *Statistical Data Analysis Explained: Applied Environmental Statistics with R*. John Wiley & Sons. 2008
- Greg Langkamp and Joseph Hull. *Quantitative Reasoning and the Environment: Mathematical Modeling in Context*. Pearson Publishing. 2007 (freely available online)

Schedule

Week 1) Course Introductions (Introduction to R)
Week 2) Descriptive Statistics (One Variable Analysis)
Week 3) Analyzing Relationships (Two Variable Analysis)
Week 4) Simple Regression (Regression I)
Week 5) Advanced Regression (Regression II)
Week 6) Midterm I
Week 7) Principal Component Analysis (PCA)
Week 8) Linear and Exponential Functions (Introduction to STELLA)
Week 9) Systems Modeling (Mono Lake Project)
Week 10) Difference Equations (Modeling Population Trends)
Week 11) Logistic Growth (Complex Modeling)
Week 12) Midterm II
Week 13) Practical Consideration in Data Analysis I (Final Project I)
Week 14) Practical Consideration in Data Analysis II (Final Project II)

Evaluation

- Attendance (5%)
- Ten In-class Exercise (10%)
- Ten Homework (40%)
- Two Midterms (30%)
- Final Project (15%)