**Summer Reading to Prepare for First-Year Core Sequence**

We will expect all students to have foundational understanding of material in a few key disciplines prior to the beginning of each quarter: ecology (fall quarter), chemistry and economics (winter quarter), and statistics (spring quarter). We are asking you, individually, to assess your background with these areas. If these subjects have not been part of your undergraduate experience (or if it’s been a long time), we would like you to review this material prior to the first-year core programs for each quarter.

**Fall Quarter: Conceptualizing Our Regional Environment**

Ecology

Students should have a basic understanding of key concepts and terms in ecological science. Those students who have not taken an ecology course as part of their undergraduate studies should review the ecology chapters from a general biology textbook, which typically covers topics such as population ecology, species interactions, community ecology, and ecosystem ecology. Copies of Scott Freeman’s Biological Science will be on reserve in the library beginning in August.

**Winter: Ecological and Social Sustainability**

Chemistry

Students should have a basic understanding of key concepts and terms in chemistry. Those students who have not taken a chemistry course as part of their undergraduate studies should order a copy of "A Simple Introduction to Chemistry" and make sure to review the following topics:

Elements  
Compounds/Mixtures  
Bonding  
Reaction Types  
Acids, bases, and salts  
Oxidation and Reduction  
Chemical Formulas

Economics

Students should have a basic understanding of key concepts and terms in economics. Those students who have not taken an economics course as part of their undergraduate studies should read the following chapters of Peter Dorman’s *Microeconomics: A Fresh Start:* 3-6, 11, 12, 15, 20. Copies of this book will be on reserve beginning in August. (Note: Peter is an MES faculty member. In order to avoid any conflict of interest, he would like to donate any proceeds from the sale of his book to MES students back to our program; if you choose to buy a copy, rather than borrowing from a library or using the reserve copies, please let him know.)

**Spring: Research Design and Quantitative Methods**

Students should understand the following concepts and skills. Most introductory statistics textbooks cover this material; we don’t have a specific textbook to recommend for this purpose.

Concepts

Ordinal vs. Nominal vs. Continuous data

Variables (Dependent and Independent)

Sample/Sampling

Simple Random Sample, Stratified Sample, Convenience Sample

Population, Sample Frame, Sample Space

Measures of central tendency: Mean, Median, Mode

Standard Deviation and Variance

Calculation of a Standard Error

Population vs. Sample

Parameter vs. Statistic

Looking at Data: Scatterplot, Histogram, Frequency Distribution

Regression (Least Squares) Line, or Line of Best Fit, Through a Scatter Plot

Slope and Intercept

The Standard Normal Distribution

Central Limit Theorem

Probability

Definition of probability

Mutually Exclusive Events

Conditional Probability

Independent Events

The p-value and its interpretation

Types I and II Error

Correlation vs. Causation

Power and Precision

Null Hypothesis

Skills

Using Excel spreadsheets to format, build formulas, transform and visualize data