

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