

APPENDIX

BIOL 134: Experimental Design, Analysis and Presentation (3)

An introduction into process and methodology in biological sciences and fundamental concepts of biological research. The course includes 1) information techniques and critical evaluation of primary literature in biology; 2) scientific writing including ethics and presentation; and 3) experimental design and statistical analysis. Fall and Spring.

Topics and Activities for this course

I. Literature Review

- A. Searching for relevant articles (collaboration with Library Staff)
- B. Critically evaluating sources
- C. Interpreting literature
- D. Synthesizing information from multiple sources

II. Data Interpretation

- A. Interpreting graphical and tabular data from literature
- B. Being able to present graphical and tabular data
- C. Choosing appropriate representation for data
 - 1. (table vs. figure; line and scatter vs. columns, etc.)

III. Scientific Writing (collaboration with Writing Center)

- A. Format of scientific *research* paper
- B. Format of scientific *review* paper
- C. Plagiarism and Citations

IV. Experimental Design and Statistical Analyses

- A. Independent/Dependent variables
- B. Replication vs. Pseudoreplication
- C. How to choose appropriate statistical test when designing experiments
- D. Data analysis and representation
 - 1. Selecting appropriate data for analysis
 - 2. Formatting data for appropriate analysis (Excel skills)
 - 3. Manipulating data in Excel
 - 4. Run t-test, linear regression, ANOVA, X^2 (in Excel or SAS or R to be standardized across the department)
 - 5. create bar graphs, line graphs, tables to present data

V. Data Collection Skills (basic skills for the discipline)

- A. Quadrat Sampling
- B. Microscopy

Table I. Comparison of student distributions under previous concentrations [Ecology and Evolutionary Biology (EE) and Cell and Molecular Biology (CM)] with the student distributions across learning area in new curriculum (Fall 2014-Spring 2016).

PREVIOUS CURRICULUM		NEW CURRICULUM*	
EE	201	Evolution	142
CM	425	Genetics	235
		Integrative	151
		Quantitative	343
		Techniques	304

* **Difference in totals between curricula are due to the same classes occurring in two learning areas under the new curriculum**