BIOL 343 Advanced Data Analysis for Biologists

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This course covers fundamentals of statistics through real-world application in biology, beginning with frequency distributions, central moments, and summary statistics, followed by linear models and model selection as a basis for exploring more advanced models. To help students apply these methods in a global context, examples related to the United Nations Sustainable Development Goals (UN SDGs) are used in the tutorials and learning assessments in this course.

Course Learning Outcomes

Foundational Knowledge	LO1: *Identify* different data types to enable coding for visualization and analysis.
Caring	LO2: *Translate* real-world observations into appropriate data types to produce visualization and analysis.
Human Dimension	LO3: *Reflect* on how positionality may bias one's experimental design and data interpretation by exploring historical and contemporary biases on scientific progress.
Integration	LO4: *Contrast* the use of fixed vs random effects and linear vs generalized linear models to ensure appropriate model implementation.
	LO5: *Simulate* data relevant to sustainable development goals to explore assumptions of statistical models.
Learning How to Learn	LO6: *Develop* a robust strategy for quality assurance and quality control to assess the reliability of statistic models.
Application	LO7: *Write* clean and coherent code in R markdown to create reports with professional formatting and an analysis that is open and reproducible.
	LO8: *Apply* appropriate statistical models to test biological hypotheses related to sustainable development goals.