Introduction to Experimental Design and Statistics
BI 399

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Meeting time: M-F 8-5
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Course Objectives: An introduction to experimental design and statistics. This course is designed for juniors and seniors in the biological sciences who want to become more conversant with experimental design and the use of appropriate statistical tests. Focus will be on modern approaches to data analysis with a focus on linear models and model fitting. The course will emphasize practical approaches to biological data using the rich marine fauna of the Oregon coast.

Materials Needed:

- There is no text. We will use articles from the primary literature and class notes. You will need access to a computer with the software package R. Computers with the necessary software are available in the SPMC library.

A good resource for learning about linear models, model fitting, and the way data analysis is going:

> Zuur, A.F., E.N. Ieno and G.M. Smith (2007). Analyzing Ecological Data, Springer Science

Evaluation of Work:

Midterm exam:	100
Final exam:	100
Homework assignments (8 @ 10 points each)	80
Literature presentations (2 @ 5 each)	10
Total:	290

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	Date		Discussion Topic
Aug	15	AM	What is (are?) statistics?
		PM	Populations: Parameters and pitfalls
	16	AM[*1]	"Pseudoreplication" produces "pseudostatistics"
		PM	The General Linear Model
	17	AM[*2]	Analysis of Variance
		PM	Goodbye ANOVA
	18	AM[*3]	Simple regression
		PM	Regression analysis for prediction
	19	AM[*4]	Regression analysis for explanation
		PM	**Midcourse Exam**
	22	AM	Regression for dummies (dummy variables that is)
		PM	Interaction
	23	AM[*5]	Is it or isn't it? Logistic regression
		PM	How many? Poisson regression
	24	AM[*6]	Those aren't independent! Mixed models
		PM	More mixed models
	25	AM[*7]	Goodness-of-fit, contingency tables
		PM	What can I do with complex data?
	26	AM[*8]	Review
		PM	**Final Exam**

[*]**Homework assignment due**