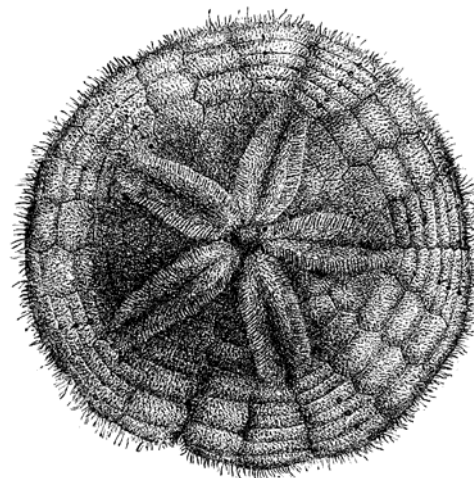


Experimental Design in Marine Biology
BI 457/557

Course Objectives: To study principles of experimental design including modeling experiments and evaluating appropriate analysis techniques. The course will draw heavily from professional literature discussing appropriate use of statistics in experimental studies. Lectures and reading will emphasize application of univariate designs in ecological studies.



Instructor: Brian Bingham, Western Washington University

Materials Needed:

- There is no text. We will be using articles from the primary literature and class notes. You should, however, have a good statistics reference book. I recommend:

Sokal, R.R. and F.J. Rohlf (1995). *Biometry*. W.H. Freeman, N.Y.

Underwood, A.J. (1998). *Experiments in Ecology*. Cambridge Univ. Press, Cambridge.

Quinn, G.P. and M.J. Keough (2002). *Experimental Design and Data Analysis for Biologists*. Cambridge Univ. Press, Cambridge.

Zar, J.H. (1999). *Biostatistical Analysis*. Prentice-Hall, Englewood Cliffs, N.J.

Evaluation of Work:

Midterm exam:	100
Final exam:	100
<u>Homework assignments (8 @ 10 points each)</u>	<u>80</u>
Total:	280

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	<u>Date</u>	<u>Discussion Topic</u>	<u>Literature</u>
DAY 1	AM	Course overview, Foundation principles of experimental design	Cherry (1999), Underwood (1981, pp. 513-545)
	PM	ANOVA: Techniques, Assumptions, Transformations	Johnson (1995)
2	AM ¹	Avoiding errors, Pseudoreplication	Hurlbert (1984), Wilbur (1993), Garcia-Berthou & Hurlbert (1999)
	PM	Models	Underwood (1981, pp. 550-560, 579-586)
3	AM ²	Models	Bennington & Thayne (1994)
	PM	Pooling, Pseudo-F	
4	AM ³	Error rates, Contrasts	Underwood (1981, pp. 528-531), Chew (1976), Peres-Neto (1999)
	PM	Interaction	Underwood (1981, pp. 560-578, 586-589)
5	AM ⁴	Graphics	Midcourse Exam
	PM		
6	AM	ANOVAR, Trend analysis	Potvin et al. (1990)
	PM	ANCOVA	Underwood (1981, pp. 589-592)
7	AM ⁵	Missing data, unbalanced designs	Young (1990), Bros & Cowell (1987)
	PM	Power	
8	AM ⁶	Correlation	
	PM	Simple regression	
9	AM ⁷	Other regressions	Cohen (1990)
	PM	Multivariate methods	Clarke (1993)
10	AM ⁸	Multivariate methods	Final Exam
	PM		

* **Homework assignment due**