UND Biology **BIOL 571 – Advanced Biometry** **Spring 2007**

Professor: Brett Goodwin **Office:** SH 207
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Lectures: Mon., Wed. & Fri. 11:00-11:50, Starcher 105 **Office hours:** TBD
Web page: via Blackboard (lecture outlines, assignments, etc.)

Textbook:
Quinn,G.P. & M.J. Keough. 2002. *Experimental design and data analysis for biologists.* Cambridge University Press, Cambridge. ISBN 0 521 00976 6.

Crawley, M.J. 2005. *Statistics: An introduction using R*. John Wiley & Sons, Ltd., London. ISBN 0 470 02298 1

Prerequisites: an introductory course in statistics

Course Description and Objectives:
The course focuses on the statistical analysis of biological data. This course should deepen your understanding of more traditional statistical techniques (e.g., linear regression, ANOVA) and introduce you to more advanced techniques (e.g., logistic regression, MANOVA). We will focus on analyzing real data sets and the interpretation and presentation of those analyses.

By the end of the course you should be able to interpret and critically assess statistical analyses in the literature, perform sophisticated statistical analyses on biological data, and present statistical techniques and results in a professional manner.

Evaluation:

Assignments (5% each; will drop two)	50%
Research project	40%
Final Exam (Take home)	10%

A ≥ 90%
B ≥ 80%
C ≥ 70%
D ≥ 60%

Assignments: There will be weekly assignments on the material covered in class. Assignments will be available on Blackboard a week before they are due. Assignments will be due in my office by 5:00 PM on Thursdays; late assignments will not be accepted. Assignments will involve analyzing real data sets and presenting the results of those analyses as they would be presented in a published paper.

Research project: You will research a statistical technique not covered in this course. You will write a paper describing the technique and illustrating how to apply the technique to biological data. You will also teach the rest of the class about the statistical technique. More details about the project will follow.

Final Exam: The final exam will be a take home exam. It will cover the entire course and involve conducting analyses like those performed for the weekly assignments.

Tentative Lecture Schedule:

Week of	Topic	Assign. Due Thurs.	Reading	
			Q & K	Crawley[1]
Jan. 8	**No class on Jan. 10** Introduction, Estimation		1, 2	1
Jan. 15	**Martin Luther King Jr. Day (Jan. 15 - no class)** Hypothesis Testing, Data Exploration		3, 4	5, 6, 7
Jan. 22	Correlation and Regression	1	5	8
Jan. 29	Multiple and Complex Regression I	2	6	11
Feb. 5	Multiple and Complex Regression II	3		9
Feb. 12	ANOVA I	4	8, 9	
Feb. 19	**President's Day (Feb. 19 - no class)** ANOVA II	5	10	
Feb. 26	ANOVA III	6	11	
Mar. 5	ANCOVA	7	12	10
Mar. 12	**Spring Recess (no classes)**			
Mar. 19	GLM & Logistic Regression	8	13	14
Mar. 26	Analyzing Frequencies	9	14	13
Apr. 2	Multivariate analyses **Easter Holiday (Apr. 6 - no class)**	10	15	
Apr. 9	**Easter Holiday (Apr. 9 - no class)** MANOVA & Discriminant analysis		16	
Apr. 16	Principle components and correspondence analysis	11	17	
Apr. 23	Student Presentations	12		
Apr. 30	Student Presentations **Reading & Review Day (May 4 – no class)**			
May 7	**Exam Week**	Take Home		

[1] These are approximate chapters – often bits and pieces of earlier or later chapters will match up with topics from Q & K. We will follow Q & K closely and Crawley as it is helpful.

Any student that needs special accommodations for learning or has special needs should discuss these needs with me as soon as possible.

Academic dishonesty (see the Code of Student Life) will result in a mark of 0 on the assignment. A second act of academic dishonesty will result in a mark of 0 in the course.