BIOL 7050 Experimental Design and Data Analysis   Fall 2015

COURSE INFORMATION:
a. **Instructor:**   Dr. Timothy Henkel (tphenkel@valdosta.edu)
b. **Office:**   Bailey Science Center 2212
c. **Office Hours:**   TH 12-1 pm and by appointment
d. **Class Meets:**   TTH 8-9:15 am Bailey 1202

CATALOG DESCRIPTION:
BIOL 7050 Experimental Design and Data Analysis in the Biological Sciences
Prerequisites: MATH 2620 or comparable course and admission into the graduate program or permission of the instructor. Application of statistical methods to the study of biological problems, with an emphasis on the interaction between the choice of statistical methods and experimental design.

GENERAL COURSE DESCRIPTION:
This course examines the principles of experimental design, including hypothesis formation and testing, replication, data collection, analysis and presentation. The course will provide a framework for developing new projects using appropriate statistical models as well as a toolset for evaluating methods used in biological literature.

REQUIRED TEXT: A Primer of Ecological Statistics (2ND edition; 2013) by Nicholas J. Gotelli and Aaron M. Ellison (1ST edition text will work for the most of the course).

REFERENCE TEXTS: (these will be used during in class discussions)
- Biometry (3rd edition; 1995) by Robert R. Sokal and F. James Rohlf
- Biostatistical Analysis (4th edition; 1999) by Jerrold H. Zar
- Primary literature used throughout the semester

GRADES: There will be two exams during the semester, a midterm and final, as well as a set of assignments throughout the semester. Final grades will be calculated as:

Midterm	30%
Final	30%
Assignments	20%
Presentations	20%

Assignments: all assignments are due at the start of class on their due date and 20% will be deducted for each day an assignment is late. Assignments will include problem sets, as well as readings and in class discussion and participation. As such, regular participation in class is required to succeed in the course.

Presentations: Students will make two presentations during the semester. First, students will present a piece of primary literature that uses one of the statistical approaches discussed in the course. Second, students will fully develop an experimental design focused on their area of research and present this to the class for feedback.

ACADEMIC HONESTY: As a graduate student, you are expected to only submit work that you have personally completed. Any evidence that your work is not your own will result in failing the course and follow up with the Graduate School. You responsible for knowing, understanding and complying with the VSU Student Code of Conduct http://www.valdosta.edu/administration/student-affairs/student-conduct-office/documents/student-handbook.pdf

TENTATIVE COURSE SCHEDULE

Week	Topic	Chapter
1	Introduction to Biostatistics	
2	Probability and Distributions	1,2
3	Descriptive statistics and parameter estimation	3
4	Framing and Testing hypotheses	4
5	Frameworks for Analysis	5
6	Designing Experiments	6-8
7	Linear Regression*	9
8	Regression Diagnostics	
9	Midterm Exam (Oct 8)	
10	t and F Distribution*	10
11	ANOVA Designs and Analysis*	
12	Handling Categorical Data*	11
13	Multivariate Data*	12
14	Multiple and Non-linear Regression*	
15	Experimental Design Presentations	
	Final Exam – Due Dec. 10	

*weeks with literature presentations on Thursday