

## ANSC5313/NRM5313/BIOL5317 - Biostatistical Analysis II Course Syllabus - Spring 2016

### **Instructor**

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### **Course Description**

An advanced class in statistical concepts and models applied to agricultural and biological systems. The course addresses experimental designs, paired-sample hypotheses, multi-sample hypotheses (ANOVA), multiple comparisons, factorial and nested ANOVA, data transformations, linear regression, correlation, multiple regression and correlation, polynomial regression, the binomial distribution, and information theoretic approaches. Emphasis will be placed on data analysis and interpretation using computer statistical applications.

### **Course Objectives**

This course addresses Program Learning Outcome 1 for the M.S. and 1 for the M.Ag. programs, which state that students should be able to: Apply statistical concepts and procedures to natural resource data.

Specific student outcomes will include the following:

1. Assess and review experimental designs, paired-sample hypotheses, multi-sample hypotheses, multiple comparisons, factorial and nested ANOVA, data transformations, linear regression, correlation, multiple regression and correlation, polynomial regression, and the binomial distribution.
2. Understand and interpret advanced statistical analyses in published research literature.
3. Interpretation and application of analytical results to research projects.
4. Application and interpretation of statistical data analysis using SPSS software..

### **Class Meeting Time/Place**

Lecture/Lab: Monday, Wednesday 10:00 am -11:50 am  
Lecture: NRM 129; Lab: NRM 126

### **Text and Supplies**

1. Zar, J. H. 2009. Biostatistical Analysis. Fifth edition. Prentice Hall, Inc. Upper Saddle River, NJ. (*Required*)
2. Norusis, Marija. 2011. SPSS Statistics 19 Guide to Data Analysis. Addison Wesley. (*Optional*)
3. Burnham, K. P., & Anderson, D. R. 2002. Model selection and multimodel inference: a practical information-theoretic approach. Springer. (*VERY Optional*)
3. Calculator (*Required*) Note: Use of internet-capable devices (e.g. smartphones) is not allowed for exams.

### **Course Outline**

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|---|---|
| 10. Multisample Hypotheses and the Analysis of Variance | 17. Simple Linear Regression                    |
| 11. Multiple Comparisons                                | 19. Simple Linear Correlation                   |
| 12. Two Factor Analysis of Variance                     | 20. Multiple Regression and Correlation (maybe) |
| 13. Data Transformations                                | BA. Information Theoretic Approaches (AIC)      |
| 14. Multi-way Factorial Analysis of Variance (maybe)    | 21. Polynomial Regression (if time)             |
| 15. Nested (Hierarchical) Analysis of Variance          | 25. Testing for Randomness (if time)            |
| 16. Multivariate Analysis of Variance                   | 26. Circular Distributions (if time)            |

### **Course Grade**

Exam I	20%
Exam II	20%
Final Exam	20%
Homework	20%
Final Project	20%

### **Grade Assignment**

<60 = F, 60-69 = D, 70-79 = C, 80-89 = B, 90-100 = A.

### **Class Organization and Policy**

Lecture and Lab are consecutive and attendance in both is essential. Lecture may run into lab if it is necessary to cover material, but in general the lab is set up for individual instruction. Please use this time wisely to work through examples, work on homework, and ask questions. It is unfair to other students to skip the individual lab instruction and then expect help during my office hours. I will be happy to help you during office hours if you are using lab time wisely. I will not be amenable to you skipping lab and then expecting personal instruction during my office hours.

Roll will be taken in each class meeting. The SRSU catalog states "The Instructor will drop a student from a course when the student has a total of nine absences. An absence is defined as nonattendance to 50 minutes of class."

Missed lecture notes may be obtained from a classmate. See me for handouts and assignments that may have been missed.

No make up exams will be given for an unexcused absence. You must notify me of an excused absence PRIOR to the class you will miss and arrangements for make up exams must be made BEFORE the exam is given.

Late assignments will be accepted at the discretion of the instructor, with a 10% penalty for each day that it is late. Late assignments will not be accepted once a full week has passed.

Academic dishonesty includes copying, sharing, or obtaining information from an unauthorized source, attempting to take credit for the intellectual work of another person, falsifying information, and giving or receiving information about a test, quiz, or assignment to other students. Any student involved in academic dishonesty will receive no credit (0) for work done and/or may be penalized in accordance with published University Rules.

*It is Sul Ross State University Policy to provide reasonable accommodation to students with disabilities. If you would like to request such accommodations because of physical, mental, or learning disability, please contact the ADA Coordinator for Accessibility Services in Ferguson Hall Room 112 or call 432-837-8203.*

***It is my hope that you find this course both enjoyable and informative!***

**Additional Outcome Objectives as Required by the Southern Association of Colleges and Schools:**

***Program Learning Outcomes for the M.Agr. in Range and Wildlife Management***

The graduating student will demonstrate that he/she is able to:

1. Apply statistical concepts and procedures to natural resource data
2. Evaluate literature and references as they apply to the natural resource field
3. Demonstrate their knowledge of the fundamentals and advanced concepts of range and wildlife management.

***Program Learning Outcomes for the M.S. in Range and Wildlife Management***

The graduating student will demonstrate that he/she is able to:

1. Apply statistical concepts and procedures to natural resource data
2. Evaluate literature and references to substantiate an applied research project.
3. Examine, select, and utilize appropriate resources, materials, and data collection instruments to implement research projects.
4. Justify and defend the research questions and design.

**Course Schedule**

Week 1	1/20	Course Overview & Chapter 10. Multisample Hypotheses and Analysis of Variance
Week 2	1/25	Chapter 10. Multisample Hypotheses and Analysis of Variance
	1/27	Chapter 11. Multiple Comparisons
Week 3	2/1	Chapter 11. Multiple Comparisons
	2/3	Chapter 12. Two Factor Analysis of Variance
Week 4	2/8	Chapter 12. Two Factor Analysis of Variance
	2/10	Chapter 13. Data Transformations
Week 5	2/15	Chapter 13. Data Transformations
	2/17	Chapter 14. Multi-way Factorial Analysis of Variance & <b>Exam I Review</b>
Week 6	2/22	<b>Exam I</b>
	2/24	<b>Exam I Results</b> / Proj. Overview / Ch 15. Nested (Hierarchical) Analysis of Variance
Week 7	2/29	Chapter 15. Nested (Hierarchical) Analysis of Variance
	3/2	Chapter 16. Multivariate Analysis of Variance
Week 8	3/7	Chapter 16. Multivariate Analysis of Variance
	3/9	Chapter 17. Simple Linear Regression
Week 9	3/14	<i>SPRING BREAK – NO CLASS</i>
	3/16	<i>SPRING BREAK – NO CLASS</i>
Week 10	3/21	Chapter 17. Simple Linear Regression
	3/23	Chapter 19. Simple Linear Correlation
Week 11	3/28	Chapter 19. Simple Linear Correlation
	3/30	Chapter 20. Multiple Regression and Correlation & <b>Exam II Review</b>
Week 12	4/4	<b>Exam II</b>
	4/6	<b>Exam II Results</b> & Information Theoretic Approaches (Burnham & Anderson)
Week 13	4/11	Information Theoretic Approaches (Burnham & Anderson)
	4/13	Information Theoretic Approaches (Burnham & Anderson)
Week 14	4/18	Chapter 21. Polynomial Regression
	4/20	Chapter 21. Polynomial Regression
Week 15	4/25	Chapter 25. Testing for Randomness
	4/27	<b>SEMESTER ASSIGNMENTS DUE</b> / Chapter 25. Testing for Randomness
Week 16	5/2	Chapter 26. Circular Distributions and project work
	5/4	<b>PROJECTS DUE</b> / Circular Distributions / Final Exam Review
Week of	5/9	<b>Final Exam</b>

**Exam Schedule**

Exam I ~February 22 (tentative)                      Exam II ~ April 4 (tentative)                      Final Exam – TBD Week of 5/9  
Semester Assignment due date – Wed April 27                      Project due date - Wednesday, May 4