

BSC 504 – Quantitative Biology

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Course objectives: The objective of this course is to provide students with the knowledge and understanding of the methods of statistical analysis applicable to biological research. Emphasis will be placed on the concepts and application of statistical thinking. Basic probability theory, parametric and non-parametric statistics including *t*-test, ANOVA, correlation, simple and multiple regression, logistic regression, model selection and other quantitative methods will be introduced.

Grading

Mid Term	100 points
Homework and Lab Assignments	160 points
FINAL EXAM	100 points

360 total points

Textbook: Zar, Jerrold, H., Biostatistical Analysis, 5th Edition, Prentice Hall, Upper Saddle River, New Jersey, ISBN# 0-13-081542-X

Homework and computer laboratory exercises: Most lecture topics will be accompanied by homework assignments and or computer lab exercises. Homework assignments will consist of problems assigned from the textbook and computer lab exercises will be given out in the computer lab. All homework and write-ups from computer lab exercises are due the following Monday.

Expectations and responsibilities of students:

Regular attendance in lecture is expected. Exams will be based on material contained in the assigned readings **AND** lectures. Final exam will cover material from the entire course.

Students are expected to read the text chapters prior to lecture in which the topics are discussed. Some exam questions will be based solely on required readings.

Students are expected to complete all homework and computer laboratory assignments.

UNDERSTANDING IN THIS COURSE IS ACHIEVED THROUGH DOING THE HOMEWORK AND COMPUTER EXERCISES. EARLY TOPICS COVERED IN THIS COURSE LAY THE FOUNDATION FOR SUBSEQUENT TOPICS. FAILURE TO COMPLETE THE HOMEWORK ASSIGNMENTS WILL ULTIMATELY LOWER YOUR TEST SCORES AND MAKE THE COURSE MORE DIFFICULT.

Obligatory Statements:

All student enrolled at the University shall follow the tenets of common decency and acceptable behavior conducive to a positive learning environment (see Student's Guide Handbook, Policies and Procedures, Conduct).

Plagiarism is a criminal activity. You must cite all sources of information. Copying of material, whether parts of sentences, whole sentences, paragraphs or entire articles, will result in a score of zero for your assignment and can result in further disciplinary action." Note that this is true throughout the University and we do have plagiarism-detecting software in place. Further information for avoiding this activity will be provided with your written assignments

Students with Disabilities: The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you have a disability requiring an accommodation, please contact: **Office of Student Disability Resources and Services, Texas A&M University-Commerce, Gee Library, Room 132, Phone (903) 886-5150 or (903) 886-5835, Fax (903) 468-8148, StudentDisabilityServices@tamu-commerce.edu**

Lecture Schedule (Tentative)

Week	Topics	Reading and Homework
8/31	<ul style="list-style-type: none"> • Introduction • Experimental Design I – Populations, Samples and Statistical Inference • Descriptive Statistics - Measures of Central Tendency, Dispersion and Variability 	Ch 1-4 Homework Exercises 3.1-3.4; 4.1-4.3
9/7	<ul style="list-style-type: none"> • Probabilities and Normal Distribution <ul style="list-style-type: none"> • t-tests - One-sample, Two-sample, and Paired-sample Hypotheses • Nonparametric t-test 	Ch 5-9 Homework Exercises 5.1-5.14; 6.2-6.6; 7.1-7.7a,b; 8.1-8.7, 8.12-8.14; 9.1-9.3
9/14	<ul style="list-style-type: none"> • t-tests (cont.) • THURSDAY Meet in Computer lab Science 210 	
9/21	<ul style="list-style-type: none"> • Open computer lab time 	
9/28	<ul style="list-style-type: none"> • Experimental Design II – Sampling considerations and sampling designs • Analysis of Variance (ANOVA) • Multiple Comparisons 	Ch 10 Homework Exercises 10.1-10.5 Ch 11
10/5	<ul style="list-style-type: none"> • TUESDAY Meet in Computer lab • Two-factor Analysis of Variance • Multi-way Factorial Analysis of Variance 	Ch 12, 14
10/12	<ul style="list-style-type: none"> • Data Transformations • Review • ***Mid-term EXAM THURSDAY*** 	Ch 13
10/19	<ul style="list-style-type: none"> • Simple Linear Regression • Comparing Linear Regression Equations • Simple Linear Correlation • THURSDAY Meet in Computer lab 	Ch 17, 18, 19
10/26	<ul style="list-style-type: none"> • Multiple Regression and Correlation • Model Checking and refinement 	Ch 20
11/2	<ul style="list-style-type: none"> • TUESDAY Meet in Computer lab • Repeated measures ANOVA 	
11/9	<ul style="list-style-type: none"> • Analysis of Count Data • Testing for Goodness of Fit, Chi-Square • THURSDAY Meet in Computer lab 	Ch 22-23
11/16	<ul style="list-style-type: none"> • Odds ratios and logistic regression • THURSDAY Meet in Computer lab 	
11/23*	<ul style="list-style-type: none"> • Model Selection - Stepwise and Information Theoretic approaches 	
11/30	<ul style="list-style-type: none"> • Jackknife, Bootstrap and Randomization tests 	
12/7	<ul style="list-style-type: none"> • TBD 	
12/14	<ul style="list-style-type: none"> • Finals Week – Final Exam 	