

Oakland University
College of Arts and Sciences
Department of Mathematics and Statistics

Course: STA 2222 (STA 228): Statistical Methods for Biology (CRN: 12538) 4 credits

Semester: Winter 2018

Instructor: Subbaiah Perla

Office: 544 MSC

Class Time: MWF 12.00 PM – 1.07 PM

Class Meeting Room: 165 SFH

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Office Phone: 248-370-3429

Office Hours: MW 3 – 4 PM or by appt.

Course (Catalog) Description: Introduction to statistical methods for students in biology and other laboratory sciences. Basic principles of experimental design and data collection. Descriptive statistics, probability models, confidence intervals, hypothesis testing, two- and multi-sample comparisons, regression models, categorical data, nonparametric methods. Mathematics or statistics majors cannot use STA 228 to replace STA 226.

Prerequisite: MTH 141 with a grade of 2.0 or higher.

General Education Learning Outcomes:

1. The student will demonstrate knowledge of one or more formal reasoning systems such as computer programming, mathematics, statistics, linguistics or logic.

In this course this entails knowledge of how to summarize data by numbers and graphs, and how to model statistical data from a variety of sources by common distributions such as normal, exponential, Weibull, binomial, Poisson, etc.

2. The student will demonstrate knowledge of application of formal reasoning to read, understand, model and solve problems across a variety of applications.

This course includes applications of correlation, regression, and analysis of variance models to study relationship between variables, and applications of statistical tests and confidence intervals to make sound statistical judgments.

Cross-Cutting Capacity:

Critical Thinking: The instruction will aim at developing “habits” of statistical thinking, beyond statistical reasoning and literacy taught in the classroom. The course will promote in students the ability to have an understanding of how statisticians think, to be able to explore data in ways beyond the classroom and textbook examples, and will promote students’ ability to ask relevant statistical questions when faced with real world problems.

Course Objectives:

The primary goal is to build a fundamental understanding of statistical methods and their proper application in biology and other laboratory sciences. The successful student will develop an understanding of the purposes and methods for acquiring, displaying and summarizing data; stochastic description of random phenomena and some useful probability distributions for modeling discrete and continuous random variables; the logic of statistical inference for estimation and hypothesis testing; methods for multi-sample comparisons and regression models; methods for analysis of categorical data; and an introduction to nonparametric methods.

Required Text and Supporting Materials:

The Practice of Statistics in the Life Sciences (3rd ed) by Brigitte Baldi and David S. Moore, Freeman (2014). A copy of the textbook will be available on 2 hour reserve at Kresge Library.

Expectations of Students:

Cultivating good work and study habits is necessary for doing well in mathematics and statistics courses. Attendance at every class is expected. You should keep on top of the subject by doing large amounts of homework (including working on problems not assigned), regularly reviewing earlier material, asking questions in class, and making good use of your instructor's office hours. If you are having difficulty with some concept or mathematical procedure, you should get it clarified as soon as possible. Regular reviewing of older material in the course will put you in good stead when it comes to final exam time. You should expect that doing all of these things will take *at least* two hours outside of class for each hour in class.

Calculator policy: You may use your calculator in all tests, homework assignments. To receive full credit on a test and homework, be sure to show all the necessary work for setting up a calculation. If you just report the final answer using your calculator and show no work, that answer will be worth zero points. Using a calculator to store formulas needed is not allowed in tests and will be deemed as a case of academic dishonesty.

Software usage and computer lab: Statistical analysis using MINITAB will be used in the class. However, students can use any statistical software (R, S-PLUS, SPSS, SAS etc.) to finish the homework assignments.

Tests and homework: There will be two tests (worth 100 points each) and quizzes, and attendance (worth 100 points). Homework will be assigned but not collected. See the syllabus for the scheduled dates of the tests. All tests, including the final examination, are closed book, closed notes.

Final exam: The final examination is comprehensive. It will be given on **Wednesday, April 25, from 12:00 –3:00 pm**. It is worth 200 points.

EMERGENCY CLOSING: If the University is closed at the time of a scheduled test (for example, because of snow), the test will be given during the next class period when the University reopens. The Oakland University emergency closing number is 248-370-2000.

GRADING POLICY: Your course grade will be based upon the percentage of total points you have earned out of the total 500 points available to you. There is no fixed grading scale for this course; a conversion formula from your percentage score to Oakland University grades will be determined at the end of the course. However, the following list shows the lowest possible grade that a given percentage score will earn (the grade may be higher than this): 95% → 4.0, 80% → 3.0, 65% → 2.0, 50% → 1.0, less than 50% → 0.0. After each test, an indication of class performance on that test and an approximate grade conversion for that test will be announced.

MAKE-UP POLICY: There will be no make-up tests. If you miss a test and have a valid excuse, your grade will be determined by giving more weight to the final exam.

ACADEMIC HONESTY: Cheating is a serious academic crime. Oakland University policy requires that all suspected instances of cheating be reported to the Academic Conduct Committee for adjudication. Anyone found guilty of cheating in the course will receive a course grade of 0.0, in addition to any penalty assigned by the Academic Conduct Committee. Working with others on homework assignments does not constitute cheating; handing in an assignment that has essentially been copied from someone else does. Receiving help from someone else or from unauthorized written materials during tests is cheating, so is using a calculator as an electronic “crib sheet.”

Important Dates

January 3:	Classes begin 7.30am
January 15:	Martin Luther King Day (no classes)
January 17:	Last day “no-grade” drops
February 17-25:	Winter recess
March 14:	Last day for official withdrawal (W grade)
April 17:	Winter classes end 10:00 PM
April 25:	Final exam, 12:00 – 3:00 pm

The Practice of Statistics in the Life Sciences (3rd ed)
by Brigitte Baldi and David S. Moore, Freeman (2014)

Chapter	Topic
1	Picturing distributions with graphs
2	Describing distributions with numbers
3	Scatterplots and correlation
4	regression
5	Two-way tables
7	Samples and observational studies
8	Designing experiments
9	Introducing probability
10	General rules of probability
11	The normal distributions
12	Discrete probability distributions
13	Sampling distributions
14	Introduction to inference
15	Inference in practice
17	Inference about a population mean
18	Comparing two means
19	Inference about a population proportion
20	Comparing two proportions
23	Inference for regression
24	One-way analysis of variance: comparing several means

STA 228 Tentative Syllabus:

Monday	Tuesday	Wednesday	Thursday	Friday
January 1 ---		January 3 Chapter 1		January 5 Chapter 1
January 8 Chapter 1		January 10 Chapter 2		January 12 Chapter 2
January 15 MLK day (no classes)		January 17 Chapter 2		January 19 Chapter 3
January 22 Chapter 3		January 24 Chapter 4		January 26 Chapter 4, Quiz1
January 29 Chapter 5		January 31 Chapter 7		February 2 Chapter 8
February 5 Chapter 9		February 7 Chapter 9		February 9 Test 1
February 12 Chapter 9		February 14 Chapter 10		February 16 Chapter 10
February 19 Winter Recess		February 21 Winter Recess		February 23 Winter Recess
February 26 Chapter 10		February 28 Chapter 11		March 2 Chapter 11, Quiz 2
March 5 Chapter 11		March 7 Chapter 12		March 9 Chapter 12
March 12 Chapter 13		March 14 Chapter 13		March 16 Test 2
March 19 Chapter 14		March 21 Chapter 14		March 23 Chapter 14
March 26 Chapter 15		March 28 Chapter 17		March 30 Chapter 17
April 2 Chapter 19		April 4 Chapter 18		April 6 Chapter 18, Quiz 3
April 9 Chapter 20		April 11 Chapter 23		April 13 Chapter 24
April 16 Review		April 18 ----		April 20 ----
April 23 ----		April 25 Final Exam 12.00-3.00pm		April 27

Link for important dates:

http://www.oakland.edu/important_dates

