

## **STAT 301 – INTRODUCTION TO BIOSTATISTICS**

### **Spring 2013 – SECTION 003**

#### **Course Description:**

A variety of statistical techniques are presented. These techniques include but are not limited to: data collection, sampling principles, graphical techniques for data display, probability distributions, parametric estimation and testing techniques, simple linear regression and correlation, multiple regression, categorical data analysis, and ANOVA. Statistical concepts will be presented and enhanced through the use of numerous “real life” data sets and case studies. In addition, you’ll have myriad opportunities to practice through in-class discussions, homework exercises and class projects.

The class will meet Monday, Wednesday, and Friday from 3:00pm until 3:50pm in Clark A 205. New topics will be discussed in lecture and detailed examples involving the calculations will be given in class. Documents will be placed on my website, which you are expected to bring to the designated class period.

#### **Prerequisites:**

One of the following:

MATH 117 or MATH 118 or MATH 124 or MATH 125 or MATH 126 or MATH 141 or MATH 155 or MATH 160.

Additionally, consult the list of vocabulary terms provided, as you should be familiar with them. The first exam will test your knowledge of these.

#### **Instructor Info:**

Charlie Vollmer

Statistics Building

Office number: 007

[charlesv@rams.colostate.edu](mailto:charlesv@rams.colostate.edu)

#### **Communication Notes:**

I try to reply to emails as soon as I can. That being said, I generally stop checking my email after 8 PM, and I don’t make it a priority after “working hours” have ended. I do promise that, outside of weekends, I will get back to you within 24 hours. If I don’t for some reason, feel free to send a follow up email.

I occasionally send out a mass email to the class if there are any last minute announcements I need to make. These are generally pretty important. They are sent to the email address that the school thinks is your main address. By default, this is a rams.colostate.edu address. If this is not your main address, change it within CSU’s system. This is easily done on RamWeb.

When you email me, do not reply to any mass emails that I’ve sent out.

I will do my best to answer questions through email, but there is a limit to what I can do. Quick general questions, reminders, and clarifications are easily handled through email, but questions specific to homework or any other assignments are usually better handled in person.

#### **Office Hours:**

Monday, Wednesday: 4:00 – 5:00 PM (right after class)

Friday: 1:00 PM – 2:50 PM (right before class)

In addition, I have a fairly flexible schedule. With notice, I can meet with you at a different time.

**Policy regarding Attendance:** Students are expected to attend each class meeting; aka **mandatory**. Notes are posted on my website after each class, but crucial announcements are often made only in class. I will ask you to leave if you are bothering others. Feel free to ask questions whenever necessary. Additionally, I expect each one of you to come to my office hours at least once to introduce yourself. In a class this size, it is difficult for me to get to know students otherwise.

**Text/Supplies:**

- Access to WebAssign. See the “Register for WebAssign” document. Cost is about \$20.
- A calculator capable of handling simple calculations such as square roots and storing numbers will be necessary. A graphing calculator is not necessary but is beneficial. Students are responsible for knowing how to use the functions on their calculator.
- **Optional:** *Statistics for the Life Sciences, 3<sup>rd</sup> Ed.*, by Samuels, Witmer, and Schaffner. The textbook is an excellent reference, with valuable examples. I will assign some reading as given in the 3<sup>rd</sup> edition, but any edition should be okay. You may consider other biostats texts as well.
- **Optional:** Access to StatCrunch. This is a data analysis tool that is strongly suggested for the projects. 6 months of access is \$12. To inspect this product, go to [www.statcrunch.com](http://www.statcrunch.com) and click on the “Explore” tab. You don’t need to purchase this until you have the first project, but you could also use some of its techniques to do some of the homework problems.

**Grading and Expectations:**

Quizzes	20%
Homework	20%
Exam 1	5%
Exam 2	10%
Exam 3	10%
Exam 4	15%
Projects	20%

*As a 3-credit course, and as per the federal credit hour definition, you can expect to receive 2 hours of work outside of every 1 hour of classroom instruction.*

Homework: There will be homework assigned on WebAssign throughout the semester to help you understand and practice the concepts that we covered in class.

Projects: There will be 4 – 6 small projects during the course that will be completed using StatCrunch, or some other program of your choice. They will correspond to the material covered during class and will give you a chance to use the skills learned to analyze real data. All completed projects **must be stapled** when they are turned in.

Quizzes: We will have tentatively 6 quizzes throughout the term. These will be announced about a week ahead of time. Makeup quizzes will only be given to those with excused absences. *At minimum*, send me an email letting me know why you missed/will miss the quiz *by the day of the quiz*. **Send me an email even if you talked to me in class.** Any makeup quizzes must be completed within a few days of it being given in class.

Exams: Four exams will be given during the semester. Exam 1 is a review exam. Exams 2 and 3 are midterms, and Exam 4 is a comprehensive final. All exams will be completed on WebAssign outside of class. These exams are open book and open note, but are not to be discussed with other students.

Exam dates are as follows:

- Exam 1: Live now. Due Friday, August 31 by 12:00 PM
- Exam 2: Week of September 24 (tentative)
- Exam 3: Week of October 22 (tentative)
- Exam 4: Live last week of class. Due Thursday, December 13 by 12:00 PM

**Grading Scale:**

There are no curves.

A:	93 – 100
A-:	90 – 92.99
B+:	87 – 89.99
B:	83 – 86.99
B-:	80 – 82.99
C+:	77 – 79.99
C:	70 – 76.99
D:	60 – 69.99
F:	0 – 59.99

Grades will be posted on WebAssign, and it is my expectation that you will regularly check your recorded grades to make sure that they are accurate. Thus, any grade issue must be resolved within 2 weeks of the score posting date. After that time, the grade stands as initially recorded.

**Course Outline:**

1. Probability
2. Normal Distribution
3. Sampling Distributions
4. Confidence Intervals
5. Philosophy of Hypothesis Testing
6. Philosophy of Non-parametric Tests
7. Categorical Data Analysis
8. Simple Linear Regression
9. Logistic Regression
10. ANOVA
11. Additional topics if time allows

**Intended Learning Outcomes:**

You are all in college now and I expect you all to be motivated enough to understand the implications of such. This is a fast-paced course that covers a lot of very deep material; we are using mathematics to explain scientific phenomena. For a diligent and motivated student, I vow to provide you with the opportunity to tap into a world-class education in which you will leave with -not only- an understanding of how statistics is needed in every scientific field, but the tools to be able to bring a sound knowledge of statistics to your future work. From weather and disease forecast/prediction, to genetics and medical studies, to pharmaceutical and insurance quality controls, statistics is involved with *literally every* aspect of biology. Regardless of your personal interests, it is expected that you will glean an –at least- basic statistical sense of how to approach data and information in our modern world, in an intelligible and -mathematically- informed manner.

**Policy regarding academic honesty:**

There is nothing I take more seriously and I urge you to read the University Conduct Code thoroughly. **If caught partaking in academic dishonesty, you will not only fail this course, but will be reported to the University for full reprimand.** I expect each of you to complete coursework responsibility with fairness and honesty.

Discussion of the homework assignments is encouraged. However, copying or sharing solutions is not allowed. Cheating includes representing the ideas of anybody except yourself as your own ideas.

**Students are responsible for completing all quizzes and exams without assistance.** No communication among students during exams is allowed. The **minimum** penalty for cheating is a 0 on that assignment or exam. The University expressly prohibits academic dishonesty such as cheating. Consult the following link for more information: [learning.colostate.edu/integrity/](http://learning.colostate.edu/integrity/).

**Additional Help:**

- **Tutors:** The Statistics Department (102 Statistics Building) keeps current lists of students who are willing and able to tutor for this and other statistics courses. TILT does provide free walk-in Statistics tutors, but they mostly cater to the 201, 204, and 301 students. Times should be posted on the TILT website sometime soon.

Asma Tahir will be grading for STAT 307 and is available for tutoring help (I don't know how much she charges).

Her email is: [asmatahirstats@gmail.com](mailto:asmatahirstats@gmail.com)

- **University Counseling Center:** A variety of services are offered in this center (C36 Clark Building), including programs for reducing text anxiety and math anxiety, as well as programs for time management, test-taking skills, memory and concentration enhancement, and study strategies. If you think that you may have a need for assistance in one of these areas, please do not delay in investigating these services.
- **Resources for Disabled Students:** (100 General Services Building) Students with mobility, visual, hearing, or learning disabilities are eligible for support, as well as students with chronic health conditions. Some services include note takers, readers and alternative testing. If you need specific accommodations due to a disability (or other circumstances), please meet with me out of class as soon as possible to discuss your needs concerning exams and/or the completion of other class requirements.
- **Academic Advancement Center:** (117 Gibbons Building) Undergraduate students who are U.S. citizens or resident aliens from one or more of the following categories, who have an academic need and are serious about their college success:
  - Low-income students
  - First-generation college students
  - Students with a learning or physical disabilities

*(Portions of this syllabus are from University policy and taken from Brett D. Hunter, with permission.)*