Syllabus
Math/Stat 3850 Foundations of Statistical Analysis
Spring 2018

Course MATH/STAT 3850 Section 4 meets MWF 9-9:50 in MDH 1003
http://math.slu.edu/~clair/stat3850

Instructor Dr. Bryan Clair
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Ritter Hall 101 or 109. Department office is 977-2444

Office Hours M10-11, W 2-3, Tu 12-1, or by appointment.
When not on official office hours, I will often be in the department chair office RH 101.
Check for me there if I’m not in RH 109.

Texts The textbook for this course is Speegle, Foundations of Statistics with R, which is linked from our course web page.

Technology We will be using the free, open source statistical software package RStudio in this course. RStudio is a modern graphical front-end to the R computer language. You are encouraged to install RStudio and R on your own computer. Software downloads, manuals, and help are available at https://www.r-project.org.

Homework Written homework will be due weekly. This will be a mix of DataCamp work, of written work and R problems.
You will need to print results of R computations, but are welcome to write other solutions by hand. I do not accept electronically submitted homework. Your work should be neat and legible, with plenty of blank space on your pages so I have room to write comments. Staple your homework!
I encourage you to work together on homework, but write up results separately, and write your own R programs, even if you are helping each other.
I grade homework on a 10 point scale, though you cannot get less than 6 for a good faith effort handed in on time:

10 All concepts well understood, at most a few minor mistakes.
9 Most important concepts understood.
8 Some conceptual issues. Important problems incorrect or missing.
7 Lack of understanding of some key points. Many problems incorrect or missing.
6 Serious difficulty understanding the material.
5 Late

Late written homework is always accepted for half credit, but I will not write comments.

Exams I give makeup exams only for severe and documented reasons.

Exam 1 Monday, February 19
Exam 2 Wednesday, April 11
Final Exam Wednesday, May 9, 8-9:50am.

There will also be a few short take-home quizzes. There will be no makeup quizzes.
Grading

Grading is on a straight scale (uncurved), with 90%, 80%, 70%, 60% guaranteeing A, B, C, D respectively. Grading is weighted as follows:

- Homework: 30%
- Quizzes: 10%
- Exam 1: 15%
- Exam 2: 15%
- Final Exam: 30%

Course Objectives

At the completion of this course, students will be able to:

1. compute probabilities of an event, given a description of the experiment that defines the event.
2. use conditional probabilities; in particular, Bayes Rule and the Law of Total Probability.
3. recognize the type of random variable that an experiment describes.
4. determine whether random variables are independent, and make computations based on independence.
5. compute expected values of random variables, from the definition and from formulas.
6. find confidence intervals for means and proportions.
7. perform hypothesis testing of means and proportions.
8. perform and interpret single and multiple regression using R.
9. perform and interpret ANOVA using R.
10. write R code which simulates an experiment in order to compute a probability.

Approximate Schedule

- Week 1: R basics. Elementary probability.
- Week 2: Probability, conditional probability, independence.
- Week 4: Discrete RVs: geometric, binomial, Poisson.
- Week 5: Continuous RVs: Exponential, normal. Exam 1.
- Week 6: Data manipulation with dplyr.
- Week 7: Graphics with ggplot2.
- Week 8: Sampling.
- Spring break
- Week 9: Confidence intervals. Hypothesis testing.
- Week 10: t-tests. Easter Break.
- Week 11: Easter Break. Non-parametric tests. Significance and power.
- Week 12: Exam 2.
- Week 13: Linear regression.
- Week 14: Multiple regression.
- Week 15: Analysis of variance.

Academic Integrity

Academic integrity is honest, truthful and responsible conduct in all academic endeavors. The mission of Saint Louis University is "the pursuit of truth for the greater glory of God and for the service of humanity." Accordingly, all acts of falsehood demean and compromise the corporate endeavors of teaching, research, health care, and community service through which SLU embodies its mission. The University strives to prepare students for lives of personal and professional integrity and therefore regards all breaches of academic integrity as matters of serious concern.

The governing University-level Academic Integrity Policy was adopted in Spring 2015, and can be accessed on the Provost’s Office website.
Additionally, each SLU college, school and center has adopted its own academic integrity policies, available on their respective websites. All SLU students are expected to know and abide by these policies, which detail definitions of violations, processes for reporting violations, sanctions, and appeals. Please direct questions about any facet of academic integrity to your faculty, the chair of the department of your academic program, or the dean/director of the college, school or center in which your program is housed.

Specific College of Arts and Sciences Academic Honesty Policies and Procedures may be found at:

http://www.slu.edu/arts-and-sciences/student-resources/academic-honesty.php

In this course: You are allowed to use any and all outside resources to help you complete your homework. Students who work together must write up results separately.

Exams and quizzes are open book and require computer use. The main restriction during these tests is that you must not communicate with other people, either in or outside of class. In cases when two or more students collaborate on an exam, all will be subject to penalties.

Title IX

Saint Louis University and its faculty are committed to supporting our students and seeking an environment that is free of bias, discrimination and harassment. If you have encountered any form of sexual misconduct (e.g. sexual assault, sexual harassment, stalking, domestic or dating violence), we encourage you to report this to the University.

If you speak with a faculty member about an incident of misconduct, that faculty member must notify SLU’s Title IX coordinator, Anna R. Kratky (DuBourg Hall, room 36; anna.kratky@slu.edu; 314-977-3886) and share the basic fact of your experience with her. The Title IX coordinator will then be available to assist you in understanding all of your options and in connecting you with all possible resources on and off campus.

If you wish to speak with a confidential source, you may contact the counselors at the University Counseling Center at 314-977-TALK.

Student Success

In recognition that people learn in a variety of ways and that learning is influenced by multiple factors (e.g., prior experience, study skills, learning disability), resources to support student success are available on campus. The Student Success Center assists students with academic related services, and is located in the Busch Student Center (Suite, 331) and the School of Nursing (Suite, 114). Students who think they might benefit from these resources can find out more about:

- Course-level support (e.g., faculty member, departmental resources, etc.) by asking your course instructor.
- University-level support (e.g., tutoring services, university writing services, disability services, academic coaching, career services, and/or facets of curriculum planning) by visiting the Student Success Center.

Disability Services

Students with a documented disability who wish to request academic accommodations are encouraged to contact Disability Services to discuss accommodation requests and eligibility requirements.

Please contact Disability Services, located within the Student Success Center, at disability_services@slu.edu or 314-977-3484 to schedule an appointment. Confidentiality will be observed in all inquiries.

Once approved, information about academic accommodations will be shared with course instructors via email from Disability Services and viewed within Banner via the instructor's course roster.