Syllabus for Probability and Statistics

Matt Rissler, PhD

January 29, 2018

Course Information

Type	Information
Course Title	Probability and Statistics
Course Number	MAT 220
Credit Hours	3
Meeting Time	MWF 14:30-15:20
Meeting Location	HENN 270
Instructor	Matt Rissler, PhD
Prerequisites	MAT 150 and (MAT 160 or CIT 115)

Instructor Information

Type	Information
Email	matthew.rissler@loras.edu
Office Phone	563.588.7792
Office	HENN 209
twitter	@discnerd

Office Hours

Day	Time	Location
Monday	09:00-10:30	HENN 209
Tuesday	09:00-10:30	HENN 209
Tuesday	12:30-14:30	Math Lab (Headwaters)
Tuesday	20:00-21:00	HENN 250 (Tasty Tuesdays)
Wednesday	09:00-10:30	HENN 209
Friday	09:00-10:30	HENN 209

If none of these work for you, email to schedule a different meeting time.

Other Help

- Math Lab (Click for schedule.)
- Thursday Nights at the Heidenreich's

Resources

Textbooks

- OpenIntro Statistics, 3rd Ed. Diez, Barr and Cetinkaya-Rundel, ISBN 978-1943450053, 2015. Available at https://www.openintro.org/stat/textbook.php?stat_book=os.
- Introduction to Probability, 2nd Ed. Grinstead and Snell. AMS ISBN 0-8218-0749-8, 1997. Also available as a pdf at http://goo.gl/XWSro.

Software

- R https://cran.r-project.org/bin/windows/base/
- Rcmdr
- various other packages in R

Course Description

Probability and Statistics is the study of randomness and identifying those changes that can be detected in spite of that randomness. It also includes the design of investigations, visualization of results, and communication of those results.

Course Objectives

Students should:

1. gain factual knowledge (terminology, classification, methods, etc.) in probability and statistics
2. learn fundamental principles, generalizations, and theories in probability statistics
3. learn to apply course material (to improve thinking, problem solving, and decision making)
4. develop specific skills, competencies, and points of view needed by professionals in fields closely related to this course

Learning Outcomes

1. Students will learn multiple probability distributions, both discrete and continuous, and learn to use them in appropriate manners. (QR 1, 2)
2. Students will learn to calculate various statistics from a data set and what probability distributions they are related to. (QR 1)
3. Students will learn to draw conclusions about a data sets statistic based on the related probability distribution. (QR 2)
4. Students will learn different sampling and experimental methods and the mistakes and biases that occur in those processes. (QR 4)
5. Students will learn to use statistical software to present and use data in tabular, descriptive, and graphical forms. (QR 3)
6. Students will effectively communicate their analyses and results. (QR 5)

QR Outcomes (reference only)

- Students will demonstrate an understanding of mathematical and statistical models.
- Students will pose questions and apply mathematical and statistical models to explore solutions.
- Students will critically analyze the presentation and usage of data in tabular, descriptive, algebraic, and graphical forms.
- Students will identify fallacies, mistakes and biases in the collection, manipulation and interpretation of data.
- Students will effectively communicate their analyses and results.

Assessment and Grading

Homework

15% of the final grade - You are expected to complete homework by the time it is due. Some homework will be assigned on WeBWorK and some on eLearn and is to be turned in to me, or my office by the time it is due. This will usually be 7:30pm on Tuesday. (Outcomes 1-5)

Quizzes

10% of the final grade - There will be a quiz on a weekly basis on the topics from the last homework assignment. (Outcomes 1-5)

Project

20% of the final grade - You will work in groups of 3ish people to analyze data of your selection. You will be required to create a report and make a presentation. (Outcomes 2-6)

Exams

25% of the final grade each - We will have two exams in this course. Each will include an in-class portion and a take-home portion. The take-home portion will be due on eLearn. Failure to attend an exam will result in a zero on the in-class portion. (Outcomes 1-4,6)

Journals

10% of the final grade - There will be a journal entry to be completed each week where you will respond to a prompt pertinent to the content of that week.

Math Culture

5% if the final grade - You are required to accrue at least 20 Math Culture points over the space of the semester. More information about culture points can be found on eLearn. Culture points are intended to expose you to a broader and deeper scope of mathematics than is available in the courses offered at Loras.

Policies

Academic Dishonesty

Please refer to the Loras College Academic Honesty Policy. It can be found at http://lorasedu.sharepoint.com/Academics/IQ/Documents/Academic%20Honesty%20Policy.doc

Learning Disabilities

In accordance with federal law, if you have a diagnosed disability or believe that you have a disability that might require reasonable accommodations, please feel free to discuss your needs with me at your earliest convenience. Documentation of your disability must be on file with the Office of Disability Services (ODS), 120 Academic Resource Center, (563-588-7134) for you to receive accommodations.

Expectation for Class Attendance

You are expected to attend every class. If you are going to miss class, email me beforehand. Assignments will be given in class randomly. Attendance will not be taken, but it will be obvious if you are not there. Note the policy for missed activities and exams.

Withdrawal Date

The last day to add a semester-long course is Friday, February 2. The last day to withdraw from this class without a 'W' is Friday, February 16. The last day to withdraw with a grade of 'W' is Friday, March 23.

Tentative Schedule

Week	Topic(s)
1	Intro to Class/R
2	Vizualizing Data/Where Data Comes From
3	Discrete Probability
4	Continuous Probability
5	Combinatorics
6	Conditional Probability
7	Distributions
8	Expected Value and Variance
9	Spring Break
9	Sum of Variables
10	Confidence Intervals
11	Hypothesis Tests
12	Linear Regression
13	More Linear Regression
14	Other Tests
15	More Tests