STAT324: Introductory Applied Statistics for Engineers

Spring 2019

Lecture:	001
Days:	Tuesday & Thursday
Time:	8-9:15am
Location:	Chamberlin 2241

Instructor

Instructor:	Duzhe Wang
Email:	dwang282@wisc.edu
Office Hours:	Wednesday 3-4pm
Office Hour Location:	1475 Medical Sciences Center (MSC) 1300 University Ave.

Teaching Assistants

TA:	Taiyu Ye	Ning Fan	Alexander Hayes
E-mail:	tye33@stat.wisc.edu	nfan@wisc.edu	hayes22@stat.wisc.edu
Office Hours:	11-12pm, Monday	1-2pm, Wednesday	10-11am, Monday
Office:	MSC1335	MSC1275	MSC1335

Note: There will be **no lecturer and TA office hours in the week of January 22**. Office hours will begin in the second Week.

Discussion section 311

TAs:	Alexander Hayes(Discussion TA) and Taiyu Ye(Support TA)
Time:	2:25-3:15pm, Tuesday
Location:	Grainger 1185

Discussion section 312

TAs:	Alexander Hayes(Discussion TA) and Taiyu Ye(Support TA)
Time:	8:50-9:40am, Wednesday
Location:	Vise Hise 594

Discussion section 313

TAs:	Ning Fan(Discussion TA) and Taiyu Ye(Support TA)
Time:	12:05-12:55pm, Wednesday
Location:	Sterling 1313

Note: Check the enrollment system for updates about the discussion location.

Goals

A student completing STAT324 can:

- Articulate the basics of probability and statistics.
- Make numeric and graphical summaries of simple data.
- Produce appropriate statistical analyses of simple data sets.
- Use R, a free statistical software package, for statistical computations and graphs.

Textbook

There is **no required textbook** for this course. The recommended text is *An Introduction to Statistical Methods* by R. Lyman Ott and Michael Longnecker.

Website

- Course website(https://dzwang91.github.io/stat324/): Lecture slides, summary notes, homework assignments, solutions and exam practice will be posted here.
- LearnUW(https://learnuw.wisc.edu/). Discussion sheets will be posted here. It will also host the gradebook.

Communication

- Outside of lecture, I may make periodic announcements to the class via the university-supplied classlist. It is imperative that your @wisc.edu email address is working.
- Responding to email can be time-consuming. **If you email me a question that is answered on this syllabus, I may not respond.**
- **For questions about homework grading and homework submission policies, please contact to your support TA (Taiyu Ye). When you email to your TA, you could copy to me as well. I will help your communication with your TA.**

General Class Policies

- Use of cell phones and laptops during classroom time is discouraged.
- **While attendance does not count toward your final grade, students are strongly encouraged to attend all lectures and discussions.**

Discussion Sections

- There are weekly in-person discussion sections led by the TAs. Discussion sections will be utilized to supplement and reinforce the lectures, mostly by working through practice exercises related to the material. Each discussion section will be based on a worksheet that will be posted to Learn@UW before the discussion. **The TA will not bring extra copies of the worksheet.** It is advised that you bring your own printed copy of the worksheet or a device with internet access to follow along.

- **There will be discussion sections held in Week 1.** The first discussion will be a tutorial of R programming.

Homework

There will be 8 homework assignments and each homework has 15 points. I will make an announcement in lecture or via email when a homework assignment is imminent.

In order to ensure that homework assignments are graded accurately and quickly, and returned to students promptly, the following homework policies will be strictly enforced:

- Turn in homework by 4pm of the date they are due, into your **Support TA's mailbox** in the lobby of the Medical Sciences Center.
- There will be **no credit for late homework.**
- **Write your name and discussion section number clearly on the front page**. Unidentifiable assignments can earn at most **half credit**, and scores can't be recorded until claimed by their owners.
- **Staple** your assignment together with real metal staples. Unstapled assignments (that is, those not held together with metal staples from a stapler) can earn at most **half credit**. Lost or untraceable pages will not be graded.
- For questions where R is used, report your results in the main body of the homework, and make sure to attach an appendix with all of your R code at the end of the assignment. Use clear, appropriate labels to indicate which section of code goes with which question.
- Homework grading will be based on correctness. To obtain full credit make sure to **(a)** show all your work and **(b)** justify all answers completely.
- The grader may deduct points for illegible writing.

- Graded homeworks will be returned to students during discussion section. **If you cannot pick up your homework during discussion, visit your TA's office hour to retrieve it. Please don't email to the instructor to ask for it**.

Exams:

- There will be 2 in-class midterm examinations and a final exam. The dates of the exams are:

Exam	Date
Midterm 1	2019/2/28, Thursday, in class
Midterm 2	2019/4/11, Thursday, in class
FINAL EXAM	7:25-9:25pm, 2019/5/5, Sunday, Location TBA

- **I will not re-schedule in-class exams for any reason other than recognized emergency situations. The final exam will not be rescheduled under any circumstances.** Plan your semester accordingly!
- Exams will be closed book. Students will be allowed to use a scientific calculator without internet access. They will be allowed one (1) 8.5" × 11" sheet of notes for Midterm 1, two (2) 8.5" × 11" sheets for Midterm 2, and three (3) 8.5" × 11" sheets of notes for the Final Exam. Cell phones and any other internet-ready device must be turned off and out of sight at all times during the exam. Students found using an internet-ready device during an exam will receive a **zero.**

Grades

- Grades will be calculated according to the following weights:

Items	Points
Homework	120
Midterm 1	80
Midterm 2	80
Final Exam	120
Total	400

- Letter grades will be assigned based on your final calculated percentage. At a minimum, your grade will be no lower than:

A	90 - 100
AB	85 - 89
B	80 - 84
BC	75 - 79
C	70 - 74
D	60 - 69

- **Do we have a curve? It depends. I can only give you the answer after grading the final exam.**
- We might have pop-up bonus in the lecture, so catch them if you need.

Computing

We will be using R for analyses that require computing. R is a free, open-source, and extremely flexible statistical computing package, and is available for download online at: www.cran.r-project.org. R Studio, an organizational interface for R, may also prove useful. It is available for download online at www.rstudio.com. No prior experience with scientific or statistical computing will be assumed. Discussion during the first week of class will be a tutorial covering how to download and install R and R Studio, along with some basic commands.

Additional Accommodations

The University of Wisconsin-Madison supports the right of all enrolled students to a full and equal educational opportunity. The Americans with Disabilities Act (ADA), Wisconsin State Statute (36.12), and UW-Madison policy (Faculty Document 1071) require that students with disabilities be reasonably accommodated in instruction and campus life. Reasonable accommodations for students with disabilities is a shared faculty and student responsibility. **Students are expected to contact the instructor of their need for accommodations via email or visiting office hour by the end of the second week of the semester, or as soon as possible after a disability has been incurred or recognized**. The instructor will either work directly with each student, or in coordination with the McBurney Center, to identify and provide reasonable instructional accommodations. Disability information, including instructional accommodations as part of a student's educational record, is confidential and protected under Federal law, in particular the Family Educational Rights and Privacy Act (FERPA).

Tutorial Center

The Statistics Department offers free tutoring for our intro level classes. Stop by for tips on homework, further explanation of class material, guidance with computer assignments, or other intro stat class questions. Tutoring is located in room 1274 of the Medical Sciences Center. See the flyer about the schedule.

Tentative Topics

1. Introduction: Descriptive vs. inferential statistics, populations and samples, types of data
2. Numerical and Graphical Summaries: Histograms, measures of location and spread
3. Probability: Definitions, simple calculations, independence
4. Random Variables and Distributions: Definitions, probability distributions, expected value and variance, Binomial and Normal distributions, Central Limit Theorem
5. Estimation: Distribution of the mean, bias, variance, confidence intervals
6. Hypothesis testing: Definitions
7. One-Sample Tests: One-sample t-test, sign test, one-sample test for proportions
8. Independent Two-Sample Tests: Boxplots, two-sample t-test, two-sample test for proportions
9. Paired Two-Sample Tests: Paired t-test, sign test
10. ANOVA: Assumptions, model fitting and evaluation, multiple pairwise comparisons
11. Regression: Assumptions, model fitting and evaluation