STAT 3011 - Introduction to Statistical Analysis (Sections 006)

4 credits, Fall 2022

Section 006 : 8:00 AM-8:50 AM MWF John T. Tate Hall 101

- **Canvas site for STAT 3011 Section 006**
- **Campuswire Q&A Feed (access code: 4958)**
- **Course website**

Instructor

Yu Yang (pronouns: she/her)
Ph.D. candidate, School of Statistics
Office Hours

Walk-in Office Hours:
Email: yang6367@umn.edu
Please include "STAT 3011" in the subject of your email.
Please email me about **private topics only** such as disability accommodation or your grade.
For other questions, please post them on **Campusewire Q&A** feed.

Teaching Assistants

Chenghao Lou
Email: lou00029@umn.edu
Office Hours: Friday 3:30-5:30pm, Ford Hall 495

Kaiyuan Deng
Email: deng0202@umn.edu
Office Hours: Thursday 2-4pm, Ford Hall 495

Korey Qiang
Email: qiang018@umn.edu
Office Hours: Wednesday 4-6pm, via Zoom (Zoom ID: 544 301 4816, Zoom Link)

Xinyi Chen
Email: chen6687@umn.edu
Office Hours: Thursday 4-6pm, via Zoom (Zoom ID: 269 477 2715, Zoom Link)

You can attend any TA's office hours. **If you have a question about homework/exam grades, please contact the TA.**

Communication

Campuswire (https://campuswire.com/p/G50FDD740, class code : 4958) will be used for Q&A. Please ask questions that are related to the course content here. See detailed instructions in this page.

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Campuswire allows students to post questions anonymously to other students/privately (only visible to instructor/TA's).

- **Before posting a question, please try yourself first**.
  - Review the syllabus for course policies. Questions such as "when is the exam 1?" and "How much is each homework worth?" can be easily answered by reviewing the syllabus.
  - For **homework questions**, I will create one post for each homework problem. Students can ask questions by clicking "Reply"
  - Review lecture materials for homework problems. Search in the Campuwire Q&A board to see if anyone asked the same question before. When you post a question, please explain what you've tried – this is especially important for any problem-solving process.
- **Please answer other students' questions**. Often you solidify your own knowledge when you explain the course material to others.
- **Important:** When posting questions related to homework problems, do not show your detailed work publicly (examples of detailed work: step-by-step work, or entire R commands). If necessary, please post privately.
- If you want to ask about clarification, general guidelines, or just to know how to start, please feel free to post it publicly and/or anonymously.
- For Exams problems, once all exam grades are posted, you can post questions publicly. Until then, please post exam problem questions privately.
- Ungraded items such as examples from lectures or practice exam problems can be posted publicly and open to discussion.
- Instructor and TA will check Q&A board daily and answer questions that are not answered (not on weekends).
- DMs (direct messages) are not suggested, and the instructor and TAs may not reply to them.

COURSE DESCRIPTION

This is an introductory statistics course intended for undergraduate students. Topics include exploratory data analysis (graphs and simple summary statistics), inference using hypothesis tests and confidence intervals, simple linear regression, one-way ANOVA, and chi-squared tests for two-way tables. Emphasis will be placed on being able to use these tools with real data. Students are expected to be comfortable with computers as we will be using R on a regular basis.

REQUIRED MATERIALS

- **Textbook:** *The Art and Science of Learning from Data by Agresti and Franklin 4th edition.*

*ISBN: 9780321997838 (**e-textbook available for free**: Go to **Canvas - Library Course Materials** then click e-textbook. Hard copies are available at the campus bookstore or other places like Amazon)*

- **Lecture Notes:** Bound copies of the lecture notes for this course will be available for sale at Paradigm Course Resource at the Fisk Building, 1621 East Hennepin Ave Suite 290, Minneapolis. You can order the packet at https://paradigm-course-resource.mybigcommerce.com/stat-3011-all-sections/ . Alternatively, you can download the notes (250 page pdf file) from the Canvas site.

COURSE WEBSITE

Supplemental notes, lab assignments, data files, etc. will be available on both canvas page and the course website.

COMPUTING: R

This course will involve computing to perform some data analysis in lab sessions and for homework. We will be using R, a free statistical software. The R can be downloaded at http://cran.r-project.org. Students should download R studio (interface more user-friendly) at https://www.rstudio.com/products/rstudio/download/#download . Public Computer Lab at Walter Library 103 has R and R studio available on some computers. See more details at https://it.umn.edu/public-computer-lab-walter-library-103. You will learn R from both the lectures and the lab sessions.

If you can't install R on your computer, you may use R studio cloud (https://rstudio.cloud/).

COURSE REQUIREMENTS

Homework Assignments

There will be nine homework assignments over the semester. The lowest grade will be dropped. This is to cover situations when you cannot turn in your homework on time such as when you are sick, your computer breaks, you lose internet connection, too many exams, etc. Use your one drop wisely. **There are no exceptions for a second drop.**

Homework assignments might vary in length and format. Each homework will:

- be from the textbook and/or a posted assignment,
- and include one or two problem(s) at the end of the assignment to be completed in R. This will be identified in the assignment. (Be sure that you only include RELEVANT code and output in the assignment you hand in. Relevant means that you directly refer to the output including plots.)
- be submitted through Canvas.

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All assignments must be typed. Cell phone pictures of the assignment will not be accepted.
Emphasis is on understanding and explaining concepts and results, rather than number crunching. The goal is to clearly communicate your results to someone unfamiliar with statistics. Points will be awarded not only to correct solutions, but also for clear work, and concise explanation and communication. *A few selected problems will be graded based on correct work. Others will be graded based on completeness. So always check the solutions after your homework is graded.*

- **All homework must be turned into Canvas no later than 11:59 pm (U.S. Central Time) on due dates to receive full credit.**
- Show your work. Even when you can do the calculation in your head, please show/explain your work. (this helps you when you review your work before the midterm and final exam.)
- Save your assignment as a pdf. Other document types are not accepted.
- Late submissions will not be accepted.
- On Tuesday morning, homework solutions will be available.
- **No assignment will be accepted via email.**

Some tips for homework:

- Homework will be posted one week before each due date.
- Start early and bring questions to lecture, lab, and office hours.
- Attend lab sessions: Lab handouts are designed to help you complete R Problems in homework assignments.
- In your homework
  - Label each problem and part (eg: Problem 1 part a), part b))
  - Follow the order (eg: Problem 1 comes before Problem 2.)
  - Read each question carefully: Some questions ask more than one task such as "Calculate the mean by hand *and* by using R, *and* interpret the result." Or "Construct a histogram using R *and describe* the overall distribution."

Each student must write their assignment up individually. **Similar assignments with minor changes will result in a score of zero for the entire HOMEWORK CATEGORY (20% of total grades) for all students involved. Copying solutions from the previous semester/other online websites will result in the same penalty.**

From Office of Community Standard (https://communitystandards.umn.edu/)

The University uses **preponderance of the evidence** as the standard of proof for alleged violations of the Student Conduct Code.

- This means that students will be held responsible for a violation of the Student Conduct Code if it is more likely than not that the violation has occurred.

Lab Sessions

TAs will conduct a one-hour lab session each week. TAs will teach you R and cover the necessary R commands to complete the current homework assignment. This will be a hands-on interactive lab, so bring your laptop with you to the lab each week. Besides working on similar homework problems, they will also solve one of the problems on the current homework assignment.

Mid-term Exams

There will be two mid-term exams throughout the semester (and one final exam). You will be given 90 minutes (1.5 hours) to complete it. Exams will be administered during the evening. These will be closed book exams, but students can bring in one 8.5" by 11" sheet of paper filled with hand-written or typed notes. You may write whatever you wish on both sides of the paper.

The tentative dates for the exams are as follows:

Week 7, **Thursday, 10/20 from 5:00 pm to 6:30 pm, Location: Anderson 310**
Week 12, **Thursday, 11/17 from 5:00 pm to 6:30 pm, Location: Anderson 310**

Final Exam

The final exam will be cumulative, and it will be held at the end of the semester. The final exam is a closed book exam, but students can bring in *two* 8.5" by 11" sheets of paper filled with hand-written or typed notes. The final exam is scheduled for
Tuesday, December 20 from 5:00 pm - 7:00 pm, location TBD.

You are required to take exams at the above time. However, if you have an examination conflict or three (or more) final exams within one calendar day, you may request an adjustment by filling out a make-up exam survey (available on Canvas, or below) and emailing proof of your time conflict to your instructor. Such a request must be received *at least two weeks before* the examination period begins.

Making-Up an Exam: If you cannot be in class on the day of an exam, it is *your responsibility to notify the instructor* by filling out 'Make up Exam request survey' available on Canvas course website before the specified due dates. Exceptions may be granted in cases of illness or emergency. You *must provide the relevant documentation* explaining your absence for the instructor to determine if an exception should be granted. If a make-up exam is granted, it will be at the discretion of the instructor. If you fail to make-up the exam at the scheduled time, you will not be able to make it up again.

- Exam 1 make-up request form (Due: Friday, TBD)
- Exam 2 make-up request form (Due: Friday, TBD)
- Final Exam make-up request form (Due: Friday, TBD)

GRADING

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Exam 1 and 2	50%
Assignments	20%
Final Exam	30%

Percentage Cutoff	Grade	Percentage Cutoff	Grade
93%	A	77%	C+
90%	A-	73%	C
87%	B+	70%	C-
83%	B	67%	D+
80%	B-	63%	D

Incompletes:

An incomplete (I) will be given only if:

- The student has a documented case of extraordinary hardship that prevents the completion of the course.
- The student has, up until the point of the request, been completing a substantial portion of the coursework and exams.
- The student's average score, at the point of the request, is 70% or above.
- The student can complete the unfinished class work within a decided-upon time frame.

Even if all these conditions are met, it is still within the instructor's rights to refuse the request. The student who is granted an incomplete grade must take the initiative to finish the course, or the grade will revert to an F.

CALENDAR

The calendar below lists the tentative dates of the course topics and readings (subject to change), as well as the due dates for the assignments and exams.

Week	Date	Topic	Lecture notes reading	Corresponding Textbook pages	Assignment Due
1	Sept. 6 - 9	Overview/Introduction to the Course	Ch 1	p 1 - 24	
2	Sept.12 - 16	Exploring & Gathering Data, Probability	Ch 2, 4.1- 4.2,	Ch 2 p 26 - 34, 36 - 76 Ch 4 p 153 - 172	
3	Sept. 19 - 23	Probability Discrete Probability Distribution	Ch 5.1- 5.3 Ch 6.1	Ch 5 p 200 - 232 Ch 6.1 p 254 - 266	HW1 (9/25)
4	Sept. 26 - 30	Normal Distribution Binomial Distribution	Ch 6.2 Ch 6.3	Ch 6.2 p 267 - 279 Ch 6.3 p 279 - 289	HW 2 (10/2)
5	Oct. 3 - 7	Sampling Distribution	Ch 7	Ch 7 p 298 - 323	HW 3 (10/9)

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6	Oct. 10 - 14	Confidence Interval for proportion	Ch 8.1, 8.2.1	Ch 8.1, 8.2 p 334 - 353 p 365 - 368	HW 4 (10/15)
7	Oct. 17 - 21	**Catch up/Review – Exam 1 (Ch 1-7)** **Thursday, Oct 20, 5:00 pm – 6:30 pm, Location: Anderson 310**			
8	Oct. 24 - 28	Confidence Interval for mean Significant Tests for proportion	Ch 8.2.2 Ch 9.1	Ch 8.3 p 354 - 364 p 368 - 370 Ch 9.1, 9.2 p 386 - 405	HW 5 (10/30)
9	Oct. 31 - Nov. 4	Significant Tests for mean	Ch 9.2	Ch 9.3 p 408 - 430	HW 6 (11/6)
10	Nov. 7 - 11	Significant Test to comparing Two Groups mean	Ch 10.3 Independent two sample Ch 10.2 Matched pairs	Ch 10.2 p 460-462, p 465-469 Ch 10.4 p 487 - 492	HW 7 (11/13)
11	Nov. 14 - 18	**Catch up/Review – Exam 2** **Thursday, Nov 17, 5:00 – 6:30 pm Location: Anderson 310**			
12	Nov. 21 - 23	ANOVA	Chapter 14	Ch 14.1, 14.2 p 669 - 684	University closed (Thanksgiving)
13	Nov. 28 - Dec. 2	ANOVA (continued) Chi-squared test	Chapter 11	Ch 11.1 p 516 - 530 p 537 - 541	HW 8 (12/4)
14	Dec. 5 - 9	Regression Analysis	Chapters 3.2 – 3.3, 12	Ch 3.2, 3.3 p 101 - 124 Ch 12 p 569 - 582	
15	Dec. 12 - 14	Review/catch up	Chapter 12		HW 9 (Monday, 12/12)
Final	Tuesday, Dec.20	**Cumulative Final Exam** **Tuesday, Dec 20 from 5:00 pm - 7:00 pm** **Location: Anderson 310**			

Important Message about Student conduct code.

You are expected to do your own academic work and cite sources as necessary. Failing to do so is scholastic dishonesty. Scholastic dishonesty means plagiarizing; cheating on assignments or examinations; engaging in unauthorized collaboration on academic work; taking, acquiring, or using course materials without faculty permission; submitting false or incomplete records of academic achievement; acting alone or in cooperation with another to falsify records or to obtain dishonestly grades, honors, awards, or professional endorsement; altering, forging, misrepresenting or misusing a University academic record; or fabricating or falsifying data, research procedures, or data analysis. (Student Conduct Code.) If it is determined that a student has cheated, the student may be given an "F" or an "N" for the course, and may face additional sanctions from the University. The Office for Community Standards has compiled a useful list of Frequently Asked Questions pertaining to scholastic dishonesty.

Beware of websites that advertise themselves as being "tutoring websites." It is not permissible to upload any instructor materials to these sites without their permission or copy material for your own homework assignments from these various sites. See the university policy : Student conduct code

If you have additional questions, please clarify with your instructor.

CLASS POLICIES

Please stay at home if you experience symptoms of COVID-19 and consult with your healthcare provider about an appropriate course of action. An absence due to symptoms of COVID-19 is an excused absence, and I will work with you to find the best course of action for missed work and/or class experiences.

Technology: The course uses technology on a regular basis during both instruction and assessments (e.g., labs, etc.). *Student's difficulty with obtaining or operating the various software programs and technologies will not be acceptable as an excuse for late work.* Due to the variation in computer types and systems, the instructor or TA may not be able to assist in troubleshooting all problems you may have.

Email: You may send me an email if it is personal, and please use Campuswire Q&A board for questions related to the course content. My goal is to respond to your email within 48 hours of receiving it. I will reply to emails received over the weekend on Monday.

Email is one source of communication between instructors, TAs and students for this course. As such, you will be expected to check your email frequently (i.e., at least once per day). As per the University policy, "students are responsible for all information sent to them via their University assigned email account. If a student chooses to forward their University email account, he or she is responsible for all information, including attachments, sent to any other email account."

STUDENT RESOURCES

SMART Learning Commons: Offers free tutoring in statistics at Walter Library and online. More information can be found at their website https://www.lib.umn.edu/spaces/smart

Disability Resource Center (DRC) : is the campus office that collaborates with students who have disabilities to provide and/or arrange reasonable accommodations. More information can be found at https://diversity.umn.edu/disability/home

Technology Support: The University Academic and Distributing Computing Services (ADCS) offers and supports a wide range of information technology-related services, functions, and processes through their website (http://www1.umn.edu/adcs/help). While most support is free to the University community, selected services or extensive consulting may be offered on a fee basis.

Writing Support: The University Center for Writing provides free writing instruction for all University of Minnesota students at all stages of the writing process. For more information, or to set up an appointment, visit their website (http://writing.umn.edu).

A FEW WORDS OF ADVICE

- It is a bad idea to fall behind in any course, but it is fatal to do so in this course: The course teaches skills and techniques, and the material is cumulative. Attend the classes regularly and do the readings and assignments on time. If you miss classes, skip assignments, and cram for the exams, you will almost surely not do well.
- Although you are encouraged to work with other students on the class activities and labs, the homework write-up and exams must be your own work. Academic dishonesty will be treated very seriously (see section on Scholastic Misconduct). Do not put yourself *and* another student in jeopardy by cheating.
- Do not hesitate to get in touch with one of the instructors or TAs if you are experiencing problems, need help, or have any questions or other course-related concerns. You can contact any of them via an email message or by coming to office hours.

UNIVERSITY OF MINNESOTA POLICIES AND PROCEDURES

Diversity: It is the University Policy to provide, on a flexible and individualized basis, reasonable accommodations to students who have disabilities that may affect their ability to participate in course activities or to meet course requirements. Students with disabilities are encouraged to contact me when possible to discuss their individual needs for accommodations.

University Grading Standards

A achievement that is outstanding relative to the level necessary to meet course requirements.
B achievement that is significantly above the level necessary to meet course requirements.
C achievement that meets the course requirements in every respect.
D achievement that is worthy of credit even though it fails to fully meet the course requirements.

S achievement that is satisfactory, which is equivalent to a B- or better.
F (or N) Represents failure (or no credit) and signifies that the work was either completed but at a level of achievement that is not worthy of credit, or was not completed and there was no agreement between the instructor and the student that the student would be awarded an I.
I (Incomplete) Assigned at the discretion of the instructor when, due to extraordinary circumstances, e.g., hospitalization, a student is prevented from completing the work of the course on time. In particular, an "I" will be given if the student presents evidence from a certified professional that the student is unable to complete the course. In addition, the student must have a passing grade at the time of the incomplete request in order to receive the "I". *Requires a written agreement between instructor and student.*

***Appropriate Student Use of Class Notes and Course Materials*:** Taking notes is a means of recording information but more importantly of personally absorbing and integrating the educational experience. However, broadly disseminating class notes beyond the classroom community or accepting compensation for taking and distributing classroom notes undermines instructor interests in their intellectual work product while not substantially furthering instructor and student interests in effective learning. Such actions violate shared norms and standards of the academic community. For additional information, please see: *https://policy.umn.edu/education/studentresp*.

Credits and Workload Expectations: Generally, when a one-credit course is taken, an average of three hours of learning effort per week (over a full semester) is necessary to achieve an average grade. A student taking a four-credit course that meets for four hours a week should expect to spend an additional 12 hours a week on coursework.

The University of Minnesota is an equal opportunity employer and educator.