Stat 892: Writing and TA Prep

Susan Vanderplas

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Syllabus

Instructor	Class
Susan Vanderplas	Location: Hardin 354 (Large Conf Room)
Email: susan.vanderplas@unl.edu	Time: Friday 2:30-3:15
Office: Hardin 343D	Office Hours (online): Schedule here

Course Goals

Your goal, as an instructor or assistant for Stat 218/Stat 380 (or any other course), is to help your students learn statistical concepts. Our primary goal in this course is to help you develop strategies to most effectively teach those statistical concepts to your students. One way to both teach statistical concepts and to gauge your students' understanding is through the use of writing. The ability to translate "stat speak" into clear non-technical language is one of the best indications that technical concepts in statistics are genuinely understood. Learning how to do this is an effective way to learn - and teach - technical concepts in statistics. We call this process "writing for learning." We will tak about this concept, and practice "writing to learn" activities throughout the course.

As a second goal of the course, we will also develop writing/critical thinking skills you will need as a teacher. This includes writing clear assignments and exam questions and developing grading rubrics. We'll spend class time analyzing examples of "good" and "bad" assignments and exam questions, and gain practice writing effective rubrics.

We hope that, through the use of active learning strategies, your classroom will become a learning community for your students. Similarly, our final goal for this course is to foster a vibrant teaching/intellectual community in the department. We hope to stimulate discussions about teaching among all instructors (TAs and faculty) and create a safe environment for idea exchange.

Course Content

The course will follow the basic outline of the STat 218 curriculum. We will try to introduce major topics a couple of weeks before they are scheduled to come up in your class, so you

have some advance preparation before you teach them/assist your mentor with teaching them. We will not cover all of the Stat 218 content. Instead, we will focus on the areas with which students most often struggle. For each statistical content area, we will discuss/model/practice how to enhance/assess student learning through the use of low-stakes writing exercises (and even some mid- and high-stakes writing), carefully written questions, grading rubrics, peer evaluation, and others.

The major topics are: - Variation: Using descriptive statistics (numbers, graphs, and plots) to visualize, characterize, and interpret data. - Sampling Distributions: The key to statistics. *Really* understanding this is a necessary, if not sufficient, condition for understanding all of statistics. This is the make-or-break concept - in Stat 218 and in Stat 883 and 970. - Inference (Interval Estimation and Hypothesis Testing): A corollary to sampling distributions and variation. Understanding the behavior of a statistic tells us about the conclusions we can draw to the larger population of interest.

Class Portfolio

During the semester, you will be asked to collect lesson plans and assessment tools in a course portfolio. The purpose of the portfolio is to provide you with a valuable resource to use with your own class in the future. We will collect the portfolios at least twice during the semester (at mid-term and at the end of the semester). By mid-term, the portfolio should contain a fairly complete plan for the first three weeks of your course. By the end of the semester, you should have a rough draft of the entire semester. Your portfolio should **NOT** be a carbon copy of your mentor's materials. The portfolio should be specific to a course (Stat 218/380). If you are assisting with Stat 380 or Stat 801/882, you may choose the course on which to focus your portfolio.

Teaching Journal

It is beneficial to keep a teaching journal, reflecting on your experiences this semester (and during future teaching opportunities). This may include writing about the mentoring experience, how a particular class or activity went, or just comments/ideas/notes for your future teaching reference. We may also throughout the semester pose specific questions as a part of class that you may want to include in your journal.

Grading

Based on class participation (attendance, discussion, writing activities), classroom visits, written work turned in (including the portfolio), constructive completion of peer reviews and timeliness of submitted work.

Class Schedule & Topic Outline
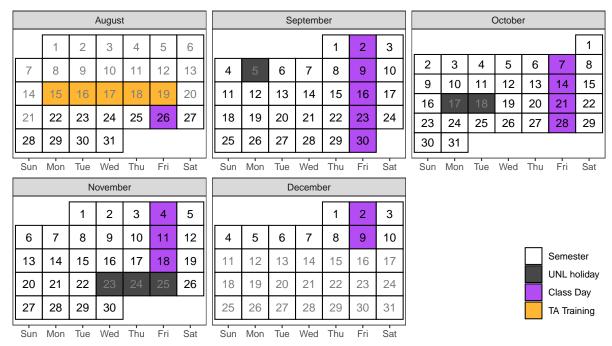
This schedule is tentative and subject to change.

August						
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			
Sun	Mon	Tue	Wed	Thu	Fri	Sat

September						
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	
Sun	Mon	Tue	Wed	Thu	Fri	Sat

October						
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31					
Sun	Mon	Tue	Wed	Thu	Fri	Sat

November						
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30			
Sun	Mon	Tue	Wed	Thu	Fri	Sat

December						
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31
Sun	Mon	Tue	Wed	Thu	Fri	Sat

Legend:
- Semester
- UNL holiday
- Class Day
- TA Training

Table 2: Tentative schedule of class topics and important due dates

Date	Topic	Through the use of...
Aug 26	Measures of Center, Variability	Assignment construction, peer review, rubrics
Sep 2	Variability	Low-stakes writing, reflection
Sep 9	Exam Construction	Mid-stakes writing, question construction
Sep 16	Sampling Distributions	Exercise construction
Sep 23	Sampling Distributions	Writing to engage students
Sep 30	Sampling Distributions	Benchmarks for sampling distributions
Oct 7	Sampling Distributions	Journals as low-stakes writing activities
Oct 14	Interval Estimation	Writing exercises to gauge understanding
Oct 21	Hypothesis Testing	TBD
Oct 28	Two sample interval estimation	TBD
Nov 4	Two-sample hypothesis testing	TBD
Nov 11	The Big Picture	TBD
Nov 18	Thanksgiving	
Dec 2	Final Exams/Grading	TBD
Dec 9	Wrap-up	TBD

Course Policies

Assessment/Grading

Assignments	Weight
Participation	60%
Mid-Term Portfolio	20%
Final Portfolio	20%

Lower bounds for grade cutoffs are shown in the following table. I will not "round up" grades at the end of the semester beyond strict mathematical rules of rounding.

Letter grade	X +	X	X -
A	97	94	90
B	87	84	80
C	77	74	70
D	67	64	61
F	<61		

Interpretation of this table:

- A grade of 85 will receive a B.
- A grade of 77 will receive a C+.
- A grade of 70 will receive a C-.
- Anything below a 61 will receive an F.

General Evaluation Criteria

In every assignment, discussion, and written component of this class, you are expected to demonstrate that you are intellectually engaging with the material. I will evaluate you based on this engagement, which means that technically correct but low effort answers which do not demonstrate engagement or understanding will receive no credit.

When you answer questions in this class, your goal is to show that you either understand the material or are actively engaging with it. If you did not achieve this goal, then your answer is incomplete, regardless of whether or not it is technically correct. This is not to encourage you to add unnecessary complexity to your answer - simple, elegant solutions are always preferable to unwieldly, complex solutions that accomplish the same task.

While this is not an English class, grammar and spelling are important, as is your ability to communicate technical information in writing; both of these criteria will be used in addition to assignment-specific rubrics to evaluate your work.

Late Policy

Late assignments will be accepted only under extenuating circumstances, and only if you have contacted me **prior** to the assignment due date and received permission to hand the assignment in late. I reserve the right not to grade any assignments received after the assignment due date.

Attendance

You are expected to attend class and/or participate virtually. Consistent, repeated failure to attend class or actively participate in the online portions of the course will affect the participation portion of your grade.

If you are feeling ill, please **do not come to class**. Contact me and I will send you a Zoom link to participate in class remotely (if you are feeling up to it), or schedule an appointment with me to meet virtually once you are feeling better.

Expectations

You can expect me to:

- reply to emails within 48 hours during the week (72 hours on weekends)
- be available in class to assist with assignments
- be available by appointment for additional help or discussion

I expect you to:

- Read any assigned material before class
- Engage with the material and your classmates during class
- Seek help when you do not understand the material
- Communicate promptly if you anticipate that you will have trouble meeting deadlines or participating in a portion of the course.
- Do your own troubleshooting before contacting me for help (and mention things you've already tried when you do ask for help!)
- Be respectful and considerate of everyone in the class

Face Coverings

I have medical issues and will wear a face covering during our class meetings; I ask that you also wear a face covering during class to reduce the impact of COVID 19, flu, and other circulating illnesses on class attendance.

Inclement Weather

If in-person classes are canceled, you will be notified of the instructional continuity plan for this class by Canvas Announcement. In most circumstances where there is power in the Lincoln area, we will continue to hold class via Zoom.

Academic Integrity and Class Conduct

You will be engaging with your classmates and me through in-person discussions, zoom meetings, and collaborative activities. It is expected that everyone will engage in these interactions civilly and in good faith. Discussion and disagreement are important parts of the learning process, but it is important that mutual respect prevail. Individuals who detract from an atmosphere of civility and respect will be removed from the conversation.

Students are expected to adhere to guidelines concerning academic dishonesty outlined in Article III B.1 of the University's Student Code of Conduct. The Statistics Department academic integrity and grade appeal policy is available here.

Required University Information

See https://executivevc.unl.edu/academic-excellence/teaching-resources/course-policies.

1 Week 1: August 26, 2022

1.1 General Overview

- Syllabus
- Food sign up sheet
- GAISE:
  Write for a few minutes - which recommendation do you think is most important to the class you're working on this semester and why?

  - Think/pair/share
  - Whole class discussion

- Microteaching questions

  - Share in pairs
  - Pick one to share with group
  - Give feedback
  - Pair revise chosen question and post in discussion board

1.2 Reminders

- Contract
- Get used to getting assignments after class

1.3 GAISE

- Incorporating real data & data collection
- Key concepts over procedures
- Group activities
- Literacy over calculation/procedures
- Computations of probability
- Activities - student engagement and gauging understanding
- Conceptual understanding

1.4 Microteaching Questions

1.5 Next week

- Write: shared understanding that students should have about measures of center
- fundamental concepts/learning objectives related to measures of center
- How do these questions address these fundamental concepts?
- Rubrics for mean/median questions
- Collect contracts

HW: write question to assess students' understanding of variability

2 Week 2: September 2, 2022

2.1 General Overview

- Shared Understanding

    - Think/Pair/Share discussion

- Divide up questions to groups who did not author - how does this Q address fundamental concepts?

- Write a rubric for each question (5 or 10 points), put rubric on the board.

2.2 Assignment

- Question addressing students' understanding of variability + author's note
  Author's note should point out a special area that you would like to pay attention to, or why you think the question works well

2.3 Next Week:

- Partner examine question and present to class - what they liked, what they thought could be improved. Class discussion

- Have histograms ready

- Lesson plan: incorporate revised question to assess students' understanding of the lesson

3 Week 3: September 9, 2022

3.1 Questions about Variability

- Think/pair/share
- Discuss questions and concerns
- Partner present Q, what they liked, how it could be improved

3.2 Good questions

- Revise and incorporate into lesson plans - due next week

3.3 Next week

- Lesson plan (turn in on canvas)
    - Highlights of lesson plan
    - Writing: How could histogram activity (or similar) enhance lesson plan?
    - Send email - important components
    - Bring 2 copies

4 Week 4: September 16, 2022

4.1 Lesson Plans

- Think/pair/share (x2) on lesson plans
    - What works? What doesn't?
    - Peer review:
        * Comments, questions, 2 reflection Qs
        * Similarities and differences between this and your lesson plan
        * What you really liked and how you might incorporate later
    - Peer review will be assigned on Canvas

5 Week 5: September 23, 2022

5.1 Lesson Plans

- Feedback on lesson plans
- Revise & upload to Canvas

5.2 Sampling Distributions

- 1 slip of paper - write word of phrase key to the definition of sampling distribution

- Words on board

- Packets passed out with additional words

- Select words to create defn of sampling distribution

Words:

- sample
- shape
- general dispersement
- difference between a value and an average value
- probability
- behavior of a sample

6 Week 6: September 30, 2022

6.1 Writing

- Discuss differences/similarities between

  - parent distribution
  - sampling distribution
  - data distribution

- Where does 'probability distribution' fit in?

6.2 Simulation

- Explore distribution of min, max, median, range

- 3 distributions - unimodal, skewed, crazy

- plotted on board

- which are parent, sampling, and data distributions?

- which are approximate? theoretical?

- What would have to be modified to explore sample size?

6.3 Next week?

- Write definition you'd give your students of sampling distribution

- Talk to mentor - 3 dates for potential teaching in October (ideally before fall break)

7 Week 7: October 7, 2022

7.1 Before Class

Watch the following videos and after each video, reflect (in writing) on the strengths and weaknesses of each video in explaining the concept of sampling distributions. What did each video explain well? Poorly?

- https://www.youtube.com/watch?v=z0Ry_3_qhDw
- https://www.youtube.com/watch?v=7S7j75d3GM4

7.2 Activity

- Write definition you'd give your students of sampling distribution
- As a class: come up with 1 definition of sampling distribution based on the individual ones

Based on that definition - identify benchmarks for student understanding - key parts - what students really need to understand to fully comprehend definition - what kind of questions would you ask them to see if they've achieved those benchmarks

7.3 Journaling

- writing activity to explore sampling distribution and which benchmarks it reinforces

8 Week 8: October 14, 2022

8.1 Interval Estimation

8.1.1 Think/pair/share:

- What is the fundamental difference between hypothesis testing and estimation?
- What is the logic behind constructing a confidence interval?

8.1.2 Discussion

What are the essential things students need to understand about confidence intervals?

8.2 Assignment

Write an open-ended free response question that asks students about confidence intervals and construct a rubric for your question. - Construct the question in such a way that they need to address the essentials of confidence intervals - make sure your rubric assigns points to those key concepts Post the question and rubric to the Canvas discussion board.

8.3 Preparation

For next week: Read the following two articles

- `https://doi.org/10.3389/fpsyg.2015.00223`

- `https://doi.org/10.2307/2291263`

And come prepared to discuss them during class

9 Week 9: October 21, 2022

9.1 Hypothesis Testing

9.1.1 Preparation: Read the following two articles

https://doi.org/10.3389/fpsyg.2015.00223

https://doi.org/10.2307/2291263

And come prepared to discuss them during class

9.1.2 Discussion questions:

- What did you learn from reading these two articles?

- What do you think about hypothesis testing given these articles?

- How did Fisher's hypothesis test differ from Neyman-Pearson's hypothesis test?

- How does null significance hypothesis testing originate from the two different concepts?

- What do your students need to understand about NSHT?

    - Is historical context necessary for them?
    - Is historical context helpful for you?

9.2 For Nov 4th

- Find a 218 instructor that has used a project in their class and interview them to learn about the project.

    - What did they learn?
    - What did the students learn?
    - What they would incorporate into future classes?
    - What would they change and why?

10 Week 10: October 28, 2022

10.1 Portfolio Summaries

- You don't have to do everything your mentor does
- What are the important components of a portfolio?
- What were the difficult parts of assembling a portfolio?

10.2 Classroom observations

- What is something your mentor does that might be helpful to other instructors?

10.3 Next week

- Discuss project interviews

11 Week 11: November 4, 2022

11.1 Discussion - use of projects in Stat 218

- What type of project?
- What did they learn?
- What did the students learn?
- What they would incorporate into future classes?
- What would they change and why?

11.2 For Next Week

- Two questions:

    - What is the variability of the sampling distribution of a statistic measuring?
    - How does variability of sampling distribution connect to tests and CIs?

- Post on discussion board

- Find an article in the Journal of Statistics and Data Science Education about an introductory statistics activity or assessment method. Claim it on the discussion board (no repeats).

12 Week 12: November 11, 2022

12.1 The Big Picture

12.1.1 Prepare before class

- Two questions:
    - What is the variability of the sampling distribution of a statistic measuring?
    - How does variability of sampling distribution connect to tests and CIs?
- Post on discussion board

12.1.2 Discussion

- What are the benchmarks for student learning about Hypothesis Tests and CIs?
    - at the end of the semester?
    - 1 year later?

12.2 Coming up

- Portfolios due Dec 13
- For next week,

    - ~~find an article in the Journal of Statistics and Data Science Education about an introductory statistics activity or assessment method~~

    - write a brief (1-2 paragraph) summary to post on the discussion board

    - Come prepared to discuss your activities and ask questions about your classmates' activities

13 Week 13: November 18, 2022

13.1 Prepare before class

- find an article in the Journal of Statistics and Data Science Education about an introductory statistics activity or assessment method
- write a brief (1-2 paragraph) summary to post on the discussion board
- Come prepared to discuss your activities and ask questions about your classmates' activities

13.2 Discussion - Activities and Assessments

- What did you learn?
- What of these activities might you incorporate in your classes?

13.3 Coming up

- Portfolios due Dec 13

14 Week 14: December 2, 2022

14.1 Wrapping up - Discussion

- What challenges are you having preparing your portfolios?
- What are you looking forward to doing when you teach 218 next semester?
- What are you still concerned about when teaching next semester on your own?

14.2 Coming up

- Portfolios due Dec 13