MAT 221: Statistics

Fall 2026

Instructor:	Jared McBride	**Time:**	Section 1: MW 11:00 – 12:15 Section 2: TR 9:30 – 10:45
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"Character is the aim of true education; and science, history, and literature are but means used to accomplish the desired end. Character is not the result of chance work but of continuous right thinking and right acting. . . . True education seeks, then to make men and women not only good mathematicians, proficient linguists, profound scientists, or brilliant literary lights, but also honest men, combined with virtue, temperance, and brotherly love — men and women who prize truth, justice, wisdom, benevolence, and self-control as the choicest acquisitions of a successful life. . . . It is regrettable, not to say deplorable, that modern education so little emphasizes these fundamental elements of true character. The principal aim of many of our schools and colleges seems to be to give the students purely intellectual attainments and to give but passing regard to the nobler and more necessary development along moral lines."

—David O. McKay
(*Gospel Ideals*, p. 440)

Information for all my students

Student Hours: Student hours are like office hours but they are not in my office. They are held, instead, right next door in the Magnolia Hall conference room (Magnolia Hall 109). They are at these times:

Tuesday and Thursday from 12:00 PM to 4:00 PM.

or by appointment. If you can't make student hours physically but can drop in on Zoom, please let me know before hand. The Zoom link will be https://zoom.us/my/drmcbsvu. Please, feel free to drop in with your questions. No appointment is necessary.

If you have a private matter to discuss, please make an appointment to see me. If it is quick (these things usually are) feel free to come to student hours and we can step into my office.

My tentative weekly schedule is as follows:

Time	Monday	Tuesday	Wednesday	Thursday	Friday
8:00 AM	MAT 305		MAT305		MAT305
9:00 AM	MAT 100	MAT221	MAT100	MAT221	MAT100
10:00 AM	MAT 343	MAT221	MAT343	MAT221	MAT343
11:00 AM	MAT 221		MAT221		Forum
12:00 PM	MAT 221	Student Hours	MAT221	Student Hours	
1:00 PM		Student Hours		Student Hours	
2:00 PM		Student Hours		Student Hours	
3:00 PM		Student Hours	Faculty Meeting	Student Hours	
4:00 PM			Faculty Meeting		

AI Use Policy: The purpose of this course is to help you develop both skills and deep understanding, especially of mathematical concepts. Homework and assignments are designed to give you the practice you need to build those skills. Some students may be tempted to use AI tools to complete their work instead of working through problems themselves. This is like signing up for a weight training class but using a machine to do the lifting for you; you wouldn't build the strength you need. The same is true here: if AI does the work, you miss the chance to develop the understanding and skills necessary for success in this course and in future courses.

That said, AI can be a helpful learning aid when used appropriately. Think of it like using a box to assist with pull-ups: you can use the box to help you get above the bar, then slowly lower yourself to build strength. After a while, you'll be able to do pull-ups without the box. Similarly, you can use AI to help you get "unstuck" on a problem—by asking for hints, clarifications, or explanations of a concept, rather than simply asking for the full answer. This is using AI to facilitate your learning rather than rob you of the chance to learn. This is what I referr to as using AI wisely.

Illustrative examples:

- **Wise use:** You are working on the homework and there is a question that you have already worked on but you keep getting it wrong, even after going to your notes and checking your method. You ask ChatGPT the question and observe what it did differently, you try it again and get it right with that modification. You make a note of that in your notes so you get it right next time. Or you make a note to ask about it in class.
- **Unwise use:** You have not yet attempted a certain homwork question but becaue you are low on time you copy the question and ask ChatGPT. Only some of the explanation makes sence or seems familiar to you, but you submit it anyway. This is dishonest and not acceptable.

In this course, the policy for AI use is to use it wisely, which often means not using it at all. The unwise use of AI is prohibited and results in a loss of points and in some cases may be reported to the Provost office as a breach of academic integrity. Also, the use of AI on any quiz or test of any kind is prohibited, and if discovered will result in a zero on that quiz or test. If you are unsure about whether your use of AI is wise or unwise, please ask me before you submit your work.

If you rely on AI to do the work for you, you may finish assignments faster, but it is unlikely that you will develop the skills you need to succeed.

One more thing, the wise use of AI is likely to be extremely important in your career. Start now learning how to get the full benefit of AI usage without compromising your own DEVELOPMENT.

Policies Specific to MAT 221: Statistics

Here is the class in a nutshell: before most class meetings there is a lesson guide to go through and fill out. You will need to read the book to do this. This will then be submitted in Canvas before Class. Once you have the basic information from the book, there will be an open note, open book lesson Quiz (also due before class) that will help you ensure that you got what you need from the book (do you dig deep enough?). Then, in class we will discuss what you learned and put it all together. In class, you will receive participation points based on your participation. After class, you will have a few homework problems to complete on XYZHomework.com along with written work in canvas. There will also be weekly quizzes and three midterm celebrations of knowledge (exams), along with "In the Wild" assignments that send you out to find real data and real statistical claims and make sense of them. Finally, there will be a comprehensive final exam at the end of the semester.

Textbook: We will be using *Introductory Statistics* by OpenStax. The book is available online and is free.

Required Materials:

- Access to Excel or Google Sheets. Graphing calculators are great and can do amazing statistics, but they are not used in the actual work force. While you can certainly use them in this class, you will be tested on your ability to perform statistical analysis with Excel (or the very near work-alike, Google Sheets).

  NOTE: Every full-time student at SVU has access to Microsoft Office Suite and, therefore, Excel. To log into this Microsoft account, use your SVU email and SVU password.

- A subscription to XYZHomework.com is required to complete the homework.

  NOTE: The easiest way to purchase the subscription is through Canvas so that it is already linked to the course. You can sign up for free and use the software for 15 days before you have to purchase the subscription. There is more information on how to subscribe to XYZ below.

Course Description: Introduction to probability and statistics. Topics include measures of center, variability, correlation, experimental design, linear regression, probability, normal distributions, confidence intervals, hypothesis testing, chi-square distributions, F distributions, t distributions, and analysis of variance.

Prerequisites: MAT 114: Finite Mathematics or MAT 115: College Algebra.

Course expectations:

- Regular attendance is essential and is required; you will lose participation points if you do not attend.
- In general, it is expected that you will spend at least **2 hours** outside of class for each hour in class in order to understand the material. To achieve excellence, more time may be required. So, budget at least 6 hours each week (in addition to class time) to spend learning this material. Note that if you are taking 15 credits that comes to about 45 hours of work a week.
- It is expected that you put your phones away during class. If I see your phone out, that may result in a loss of participation points.
- Class time is work time. During the times we meet, I expect you to be ready to work. This is not a lecture series in which you can sit and listen passively. My goal will be to get each of you to exercise your minds each day in class.

Grading Scheme:

Lesson Guides	5%	**Daily Work 40%**
Pre-Reading Quizzes	5%	
Participation Points	10%	
XYZ Homework	10%	
Written Work	10%	
Weekly Quizzes	5%	
In the Wild	10%	
3 Celebrations (10% each)	30%	
Comprehensive Final	15%	
Total	**100%**	

(The percentages guarantee at least the following letter grades.)

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

Lesson Guides (5%): Each day, you will be given a lesson guide that helps you become familiar with the material for that lesson. You will fill these out reading the book. These are due before class on the day we discuss that material. You can submit them late for half credit, but they must be submitted within a week of our discussing the covered topic. Also, because it is so crucial that you come prepared to the class discussions **NONE** of these assignments will be dropped.

Pre-Reading Quizzes (5%): Once you complete the pre-reading portion of the lesson guide for a given day, you will need to complete a short quiz on that material. These quizzes are open book and open note, but they are not open AI. You can use the book and your notes, but you cannot use AI to help you with these quizzes. These quizzes are due before class on the day we discuss that material. I do not accept these quizzes late. However, at least two of these quizzes will be dropped at the end of the semester, so if you miss one or two, that will not hurt your grade.

Participation Points (10%): In class there will be a lot of discussion and you will be given lots of opportunity to participate in that discussion. Each day will be out of 5 points, 5 points for active participation in class discussions and activities. This means you are engaged, asking questions, and contributing to the learning environment.

A large share of our class time will be spent *working problems together*, and each of you will be given the opportunity to contribute — to put a step on the board, to explain why you chose the test you chose, to say where you got stuck. This is deliberate. Reading a worked example and watching someone else solve a problem are not the same as solving it yourself, and it is easy to leave a class session feeling like you understood everything and then sit down in front of a blank spreadsheet and not know where to begin. My goal for you is not merely that you *know* the material, but that you can *do* it: that when you are handed a data set and a question, you know how to proceed. That skill is built by doing, in the room, with help nearby — which is exactly what your participation grade is meant to reward.

There are a number of ways to lose participation points,

- If your phone is out during class, that may result in a loss of participation points.
- If you are not engaged in the discussion or do not contribute to the learning environment, you may lose participation points.
- If you are absent, you will not receive participation points for that day.
- Arriving late or leaving early may also result in a loss of participation points for that day.

  Participation points can be made up in student hours, provided you do so within one week of the missed class.

XYZ Homework (10%): Homework assignments will be completed through an online system: www.xyzhomework.com. This platform is integrated with Canvas, so your scores should automatically appear in the Canvas gradebook. The system allows you to enter your answers and receive immediate, automated grading. At the end of the semester, your 2 lowest homework scores will be dropped. Please use AI wisely if at all on these assignments.

When homework is due. Homework is assigned on the day we cover the material, and the deadline depends on which day of the week that is:

We meet on	**Homework is due**	**Section**
Monday	the following Thursday	Section 1
Tuesday	the following Friday	Section 2
Wednesday	our next class meeting	Section 1
Thursday	our next class meeting	Section 2

Everything is due at 11:59 PM on the date listed in Canvas. The pattern gives you three days on the first assignment of the week and carries the second one across the weekend, so you always have the material fresh from class and at least one full weekend day to work. Because the two sections meet on different days, your deadlines differ from the other section's — always trust the date on your own Canvas assignment rather than a classmate's.

To access the homework, simply open any XYZ Homework assignment in Canvas. The first time you do this, you will be prompted either to log in (if you already have an account) or to create a new account. You will begin with a 15-day trial period, after which your account must be activated. This can also be done directly through Canvas. Most students are able to complete this process without difficulty, but if you encounter any issues, please be patient and let me know right away so we can resolve them.

Note: As you activate your account it will ask if you have an access code, these are often included with a new textbook purchase. Since we are using a free textbook, *you will not have an access code.* You will need to activate your account with an online (discounted) purchase.

A discounted subscription is available through the OpenStax Pass using the discount code `XYZF26`. Remember, the textbook itself is free. Many students have found this link very helpful: https://xyzhomework.com/support/enrollment-activation-lti

This system includes a "late pass" feature. You begin the semester with 10 late passes in your XYZ account, which you may apply without notifying me. Each late pass extends the due date of an assignment by **72 hours (3 days)**. Passes may be stacked; for example:

- An assignment due Monday at 11:59 PM becomes due Thursday at 11:59 PM with one late pass. A second late pass moves the due date to Sunday at 11:59 PM.
- Submitting an assignment 13 days late would require 5 late passes (4 late passes would only push back the deadline 12 days).

If you need more than 10 late passes, simply let me know and I will add them to your account.

All homework and all other work (excluding the final exam) must be completed and submitted by **December 8 at 11:59 pm** in order to be included in your final grade.

Written Work (10%): As you work through the XYZ homework, you will be asked to write some things down. You will submit this written work in Canvas. There will be no late penalty for this work, but it must be submitted by the end of the semester (by the end of December 8) to be included in your final grade.

Weekly Quizzes (5%): About each week, there will be a short quiz covering the material from that week's lessons. Their main purpose is to get you ready for the Celebrations of Knowledge: they are written in the same spirit as the Celebration questions, so treat each one as a low-stakes rehearsal for the real thing. Some of these will be given on paper near the end of class at our last meeting of the week — Wednesday for Section 1 and Thursday for Section 2 — and others may be assigned to be completed outside of class. I will always tell you which in advance. There are **eight** of them; there is no weekly quiz during a week containing a Celebration of Knowledge, and the planned dates are listed in the course schedule. If you miss one, or wish to retake it, you may do so in student hours.

In the Wild (10%): Statistics does not live in a textbook. It lives in the news, in advertising, in published research, and in the arguments people make to persuade you of things. These assignments send you out to meet it there. They come in three kinds, and we will do some of each:

- **Statistics in the wild.** You will find statistics out in the world — a news article, an advertisement, a published paper — and analyze the claims being made. What was the population? What was the sample? Does the conclusion actually follow from the data? What would you need to know before you believed it?
- **Modeling a real situation.** You will describe something in the world that one of our probability models actually fits, estimate the parameters for it, use the model to make a prediction, and then — where the data exist — check whether your prediction held up.
- **Small projects with real data.** You will locate or gather a real data set — a survey you run, a public data set, numbers you collect yourself — and analyze it using the methods we have learned. These are small and deliberately imperfect. The data may be biased or messy, and that is part of the lesson.

Statistical Malpractice (extra credit): Running all semester alongside the assignments above is a standing hunt. If you find a genuine instance of statistical malpractice — a misapplied test, a misleading graph, a conclusion the data cannot support — and you are the **first** to submit that particular instance, you will earn **1% extra credit on your final course grade**. Each student may claim this **once**. You must tell me where it was published, produce the study or article itself, and explain precisely what went wrong and why it matters.

The test is whether the thing actually *misleads*, not whether a rule was broken. A bar chart with a broken vertical axis is the classic example: if cutting the axis makes a trivial difference look dramatic, that is malpractice and I want to see it. If

the bars are about the same size anyway and the broken axis does not change what a reader walks away believing, that is merely unconventional, and it does not count. Always ask whether a reader would come away believing something the data cannot support.

Every claimed instance will be posted on a page in our Canvas course, so you can always see what has already been found and what is still out there waiting. Two submissions count as the same instance when they are the same item by the same person in the same paper or article; the same sort of error somewhere else is fair game. Bring me your findings; I love these.

At our last class meeting you will present your project to the class. Full instructions and rubrics for each "In the Wild" assignment will be provided separately.

Midterm Celebrations of Knowledge (30%): You have worked hard to learn this challenging material. Three times during the semester—at the end of each unit—you will take some time to see how far you have come. This will be done through a midterm exam, which I call a *Celebration of Knowledge*. Now, don't let this Orwellian newspeak fool you: a Celebration of Knowledge is simply an exam with a friendlier name. But it's also a genuine opportunity to showcase what you've learned. Your score will clearly demonstrate to both of us how far you've progressed—giving us real cause to celebrate.

There will be three Celebrations of Knowledge during the semester. Each Celebration of Knowledge is worth 10% of your final grade, for a total of 30%. Each one will be taken in the **Testing Center**, located in **Robey 10**, which is open **Tuesday through Thursday from 4:00 PM to 10:00 PM**. Each Celebration is open for a window of three days in the testing center, listed in the course schedule; you may come in at any point during that window. Policies for missed Celebrations, and for the Final replacing a low Celebration score, are described below.

Comprehensive Final (15%): At the end of the semester there will be a comprehensive final exam covering the entire course. Where each Celebration of Knowledge looks at a single unit, the final asks you to hold the whole thing at once — to look at a question and know which tool it calls for, and why. This is the capstone of the course and is worth 15% of your final grade.

The final will be given during the final exam period, **December 10–15**; the exact date and time will be announced once the University publishes the exam schedule. Our last class meeting is reserved partially for review, and I will provide a study guide well in advance.

Final Exam Replacement Policy

If a student earns a higher percentage on the final exam than on one of the Celebrations of Knowledge, then the lowest Celebration of Knowledge score **will be replaced** by the final exam percentage (scaled to 100 points).

Here are some important notes about this policy:

- You must complete the final exam to qualify for this policy.
- If the final exam percentage is lower than your lowest Celebration of Knowledge score, no replacement will be made.
- This policy does not apply in cases of a violation of Academic Honesty.

Examples:

Example 1: Low Score

- Celebration of Knowledge percentages: 80%, 85%, 75%
- Final Exam percentage: 90%
- New Celebration of Knowledge percentages: 80%, 85%, 90%
- Final Exam percentage remains: 90%

Example 2: Missed Celebration of Knowledge

- Celebration of Knowledge percentages: 80%, 0%, 75%
- Final Exam percentage: 90%
- New Celebration of Knowledge percentages: 80%, 90%, 75%
- Final Exam percentage remains: 90%

Missed Celebrations of Knowledge: Because the Final can replace the lowest Celebration of Knowledge score, no make-up opportunities will be offered for a single missed Celebration of Knowledge. Bear in mind that each Celebration is open for three days in the Testing Center, so missing one means missing every day of that window.

If a student misses more than one Celebration of Knowledge, it is their responsibility to contact me within 24 hours of the close of that Celebration's testing window. In such cases, a make-up may be offered and a penalty of up to 20% may be applied. Any make-up must be scheduled within two business days of the close of the original window; no further extensions will be granted. Failure to make timely contact or to provide sufficient evidence of a legitimate reason may result in a grade of zero.

If a student knows in advance that they will need to miss a Celebration of Knowledge due to an official university activity, they must notify me at least one week prior to the start of the testing window in order to arrange an alternative time.

Course Goals: After completion of the course you should be able to do the following:

1. Develop the habit of mind and cognitive tools to question and critically analyze a statistical study.
2. Learn to summarize, visualize, and describe data using the core tools of descriptive statistics.
3. Understand key probability distributions — including the binomial, Poisson, and normal distributions — and apply them to model real-world phenomena.
4. Understand how null hypothesis significance tests work and the requirements that must be met for them to be valid.
5. Understand what correlation is and how it differs from causation.
6. Design and carry out a simple statistical study, from formulating a research question to collecting and interpreting data.

Core Learning Goals (CLG): Here is a reminder of the goals SVU has for each graduate. Students completing Southern Virginia's core curriculum are expected to attain the following college-level competencies:

- *Careful Writing:* Students will be able to present arguments in clear written English with proper spelling, grammar, vocabulary, and transitions.
- *Critical Thinking:* Students will be able to separate a conclusion from its premises and evaluate how well the premises support the conclusion.
- *Analytic Reasoning:* Students will be able to evaluate a body of evidence and draw appropriate conclusions.

Core Values: Lastly, Here is a reminder of the values SVU endeavors to foster in each student. Students demonstrate:

- *Scholarship* by coming prepared to class, focusing on activities in class, and meticulously completing homework assignments.
- *Discipleship* by being respectful of others and showing courtesy and concern for others and the learning environment.
- *Accountability* by faithfully attending class and coming on time, coming prepared, being aware of assignments given and completing them on time.

- *Enthusiasm* by participating in class discussions and completing in-class activities, showing interest in cultural material and discussions about mathematics in general.
- *Refinement* by going above and beyond in living the dress and grooming standards, their manner of speech and actions, cleaning up the classroom and following proper classroom etiquette. This includes not using cell phones (texting, etc.) or other electronic devices that may disrupt learning in the class.

Title IX

Southern Virginia University is committed to providing an environment that promotes personal integrity, civility, and mutual respect and is free of all forms of sex discrimination and gender-based violence, including sexual assault, sexual harassment, gender-based harassment, domestic violence, dating violence, and stalking.

Southern Virginia University, in compliance with Title IX, supports the academic success of pregnant students and students with pregnancy-related conditions (pregnancy, childbirth, termination of pregnancy, lactation, and all related medical conditions or recovery). Students may request reasonable, related modifications from the University by contacting the Title IX Coordinator at titleix@svu.edu.

Title IX of the Education Amendments of 1972 states that "No person in the United States shall, on the basis of sex, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any education program or activity receiving Federal financial assistance." Title IX applies to all employees and students and covers discrimination in programs, admissions, and activities.

You can report any concerns to the Title IX Coordinator, Nathan Friesema (titleix@svu.edu), your professor, the Wellness Center, or any university administrator. Please be aware that all instructors are mandated reporters, so by law, we must disclose details relayed to us about any possible Title IX infraction to the University's Title IX coordinator.

Accommodations: Southern Virginia University is committed to providing a learning environment that accommodates and supports students with disabilities through accommodations. The Office of Accessibility Services oversees Academic Accommodations. Students with any type of physical, medical, psychological, or emotional disability may be eligible - through the Americans with Disabilities Act (ADA) - to receive accommodations to provide equal access to the academic settings. Any student seeking accommodations should contact the Office of Accessibility Services by emailing accessibility@svu.edu. Students are advised to take care of the necessary documentation and paperwork early in the semester. Accommodations are not made until the student follows the procedures outlined on the website, (`https://catalog.svu.edu/policies/accessibility-and-accommodations`) receives an official accommodation letter AND discusses it with their professors.

Academic Honesty: Following the code of conduct, (`https://svu.edu/about/faith/code-of-conduct/`), students are expected to "be honest in all things, obey the law and follow university policies, and not cheat, steal, or plagiarize." The objective of every faculty member is to empower students by providing opportunities for learning in the best environment possible. If there are questions about what is honest or dishonest behavior, please speak to your professor. Violations of academic honesty are reported to the Office of the Provost and appeals are handled through the student grievance process.

Wellness: We are located on the second floor of Main Hall, Room 234. We are open from 8am to 5pm Monday to Friday. To schedule an appointment with a therapist please Call or Text 540-261-8474, email counseling@svu.edu, or stop by in-person. We strive to accommodate same-day appointments for urgent needs whenever possible.

For Mental Health Emergencies After Hours:

Please use any of the following options:

- **Call or text 988** — Suicide and Crisis Lifeline
- **1-855-222-2046** — Rockbridge Area Community Services Behavioral Health Hotline
- **540-261-4911** — SVU Campus Security

- **Visit the ER** — Carilion Rockbridge Community Hospital
  1 Health Circle, Lexington, VA 24450
- **Call 911**

AI was used in the development and editing of this document.