

MATH 321 Section 1 CRN 21037 ~ *Mathematical Statistics* ~ Spring 2026
MT RF 11:00-11:50 a.m. in RB 452

Instructor: Dr. Rebecca Pierce
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Student Hours: T: 2:00-4:00 pm, W: 10 am-Noon, or by appointment

Text and Materials: Our text is Probability and Statistical Inference, 10th Ed, by Hogg, Tanis, Zimmerman. A physical textbook is required. For more information about obtaining required course materials, check the Ball State Bookstore. A TI-83/84 Plus or another graphing calculator is required. Instructor approved graphing calculator apps will be allowed and will be discussed the first week of class. Students may need to bring laptops to class.

Course Description: Random sampling, statistical inference, and sampling distributions, point and interval estimation, method of moments, maximum likelihood, mean square error, consistency, efficiency, uniformly minimum-variance unbiased estimator (UMVUE), Neyman-Pearson Lemma, Likelihood ratio tests, test of statistical hypotheses, goodness-of-fit, contingency tables.

Prerequisites: C- or better in MATH 320 or permission of the department chairperson.

Course Objectives: Students will be able to

- Define key statistical concepts such as random sampling, statistical inference, and sampling distributions.
- Compute maximum likelihood estimates (MLEs) and method of moments estimators for given probability distributions.
- Use sampling distributions to determine confidence intervals for population parameters.
- Formulate statistical hypotheses and apply the appropriate testing strategy to assess the hypotheses.
- Formulate a contingency table and apply goodness-of-fit tests to assess the fit of a statistical model to data.

Course Modality/Structure: The presentation of the course material will be delivered through lecture, Canvas course site, the textbook and in-class activities. Laptops and cell phones will be used at the direction of the instructor. This is a face-to-face class which requires you to attend class. What we do in the course during our class meetings will determine a portion of your grade. Of course, I understand that sometimes emergencies or other unexpected circumstances arise that make attendance that day impossible. If this is the case, please talk with me as soon as possible so we can plan to get you caught up (this provision will not apply to non-emergencies like oversleeping). If you will be absent from a class for a university-sponsored activity, please contact me — beforehand — regarding any work you might miss.

Participation/Attendance: Learning is an interactive process. Class attendance and participation are essential for success. As your instructor, I am here to facilitate this process and encourage you to actively participate in your own learning. Mathematics or statistics, like many things in life, requires repetition and practice. Completing assigned readings or watching videos before class will be essential to understanding concepts. What we do in the course during our class meetings will determine a portion of your grade. Complete academic integrity is expected in all aspects of this course. It is my goal to create an atmosphere in which we can all learn from one another.

Students are expected to attend all of their classes and are responsible for notifying faculty once they anticipate being absent for any reason. Absences will be excused for the following: funeral and bereavement leave, jury duty, late course addition, military absences, observance of religious holidays, pregnancy leave, student-athletes participating in University or department-approved activities, and university advisories. The student will need to provide documentation (with confidential information redacted when appropriate) to the instructor if requested. Further explanation can be found [here](#).

Students may encounter other circumstances (e.g., car accidents, job interviews) that result in course absences. Only faculty members can excuse these absences and adjustments are at the discretion of the instructor. Appropriate documentation will need to be provided to the instructor if requested.

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Communication: Class announcements and important documents will be provided on the class Canvas site. The Canvas Inbox message system will be used for communication between the instructor and students. Students are expected to check the class Canvas site and their Canvas Inbox on a regular basis. Students should use the Canvas Inbox message system to communicate with the instructor. I will check Canvas messages regularly throughout the day M-F from 9am-4pm. During this time, I will *do my best* to respond by the end of the day. If you send me a message after 4pm M-Th, I will respond within 24 hours. Messages sent after 4pm on Friday and anytime on Saturday and Sunday will be responded to the following Monday by 4pm.

Grade Components (Weight):

- **In-class activities/quizzes (10%):** These class participation activities will occur on a regular basis, may be collected for grading and two lowest of these will be dropped.
- **Homework problems (15%):** are due throughout the semester. You will generally have at least a few days to complete the assignments. The intention is for you to work on the assignment throughout that time. **You are encouraged to work with other people in the class but the work you turn in must be your own.**
- **Exams (60%: 10% each):** There will be 6 exams over material from the textbook in chapters 4, 5, 6, 7, 8, and 9. Exams will be taken during class time.
- **Final Exam (15%):** There will be one **comprehensive** final exam covering all 6 chapters.

Assignment details will be posted and updated on Canvas. Please check Canvas regularly to stay informed and on track. A detailed calendar will also be provided on the first day of class. Internet connectivity and technical issues may occur and impede you from turning in work on time. Turn in work early and often, and set up a back-up plan, such as visiting a local library or borrowing a peer's computer to avoid late penalties.

Final Grade: Your grade will be determined from the following weights:

In-class Activities/quizzes	10% (2 lowest dropped)
Homework problems	15%
Six Exams	60% (10% each)
Final Exam	15%

Evaluation: The grading scale below will be used to assign your final grade:

A $\geq 93\%$	C+ $77\% \leq X < 80\%$	D+ $67\% \leq X < 70\%$	F $< 60\%$
A- $90\% \leq X < 93\%$	C $73\% \leq X < 77\%$	D $63\% \leq X < 67\%$	
B+ $87\% \leq X < 90\%$	C- $70\% \leq X < 73\%$	D- $60\% \leq X < 63\%$	
B $83\% \leq X < 87\%$			
B- $80\% \leq X < 83\%$			

Make-Up Policy Quizzes & Exams: For the opportunity to make-up or submit late work, please speak with me **prior** to the due date of the assignment or exam.

Final Exam: Thursday, April 30, 2025 9:45 to 11:45 a.m.

Important Dates: There are no classes held on the following days: Martin Luther King, Jr. Day: January 19, Spring Break: March 2 – 6.

Withdrawal: The course withdrawal period ends Thursday, March 19. Before this date, students can elect to receive a “W” for the course by completing and submitting the proper form. The instructor’s permission is not required. For details, see <https://www.bsu.edu/about/administrativeoffices/registrar/registration-activities/withdraw-from-classes> as well as Degree Requirements and Time Limits in the current Undergraduate Catalog OR Withdrawal Procedures in the current graduate catalog.

Technical Information: It is your responsibility to become familiar with the class interface and seek help if necessary. BSU provides resources to help you. A lack of Canvas knowledge is not an acceptable excuse for late or incomplete work.

- **Technical Assistance:** If you have technical questions, you can contact Ball State’s Help desk. The helpdesk can be contacted at 765-285-1517 (Toll-Free 866-771-3276) or at <https://bsu.service-now.com/helpdesk>

Hours of Operation: Monday-Thursday: 7:30am to 7:00pm & Friday: 7:30am- 5pm

University Statement: We are committed to ensuring that all members of the community are welcome, through valuing the various experiences and worldviews represented at Ball State and among those we serve. We promote a culture of respect and civil discourse.

Disability Statement: If you need course adaptations or accommodations because of a disability, please contact the instructor of record as soon as possible. Ball State's [Disability Services Office](#) coordinates services for students with disabilities; documentation of a disability needs to be on file in that office before any accommodations can be provided. Disability Services can be contacted at 765-285-5293 or dsd@bsu.edu.

The Learning Center: The Learning Center offers free Tutoring and Academic Coaching for many courses at Ball State. Students can make appointments for online (Zoom) or in-person (NQ 350) appointments. To make an appointment, visit myballstate.bsu.edu and click on “Navigate” in the Academic Tools section, or just go directly to <https://bsu.navigate.eab.com>.

Testing accommodations for students with disabilities are available for students who have received the appropriate documentation from Disability Services. Tests may be administered in the Learning Center. For more information about Learning Center programming, visit bsu.edu/learningcenter or call 765-285-1006. Follow us on Instagram: [BallStateLC](#).

Mental health concerns: The Ball State University Counseling Center offers free and confidential services to all students. The Counseling Center is located in Lucina Hall, Room 320. To schedule an appointment, you can contact us at 765-285-1736. Ball State now also offers a 24/7 Crisis Line, which can be reached at 765-285-HOPE (4673). The Crisis Line is a mental health resource for those who are struggling with any mental health concerns, including thoughts of self-harm and/or suicide.

At the Ball State Counseling Center, we see students for a variety of reasons, some of which include homesickness, relationship concerns, anxiety, and depression. At your first appointment, you will work with a therapist to create a plan that will connect you with resources that best fit your needs. We assist students with getting connected to therapy at our Center as well as connecting students to self-help resources, other on-campus resources, and community-based resources. All Ball State students also have access to several on-demand, self-help resources through a variety of different platforms. All of these resources, including a direct link to our website, can be found [here](#).

The Basic Needs Hub: If you are having difficulty affording enough food, do not have a safe and reliable place to sleep, and/or experiencing an emergency or crisis, help is available through the [Basic Needs Hub](#). The Basic Needs Hub has information, resources, and provides individualized support to students. To talk with a supportive staff member about your experience, receive one on one assistance, or learn more about resources, you can submit a [Basic Needs Assistance Form](#).

Freedom of Expression: In this course, we are committed to fostering a learning environment that values intellectual diversity, encourages free expression, and promotes open inquiry. As members of the Ball State Community, we treat each person in the Ball State community with civility, courtesy, compassion, and dignity and respect and learn from differences in people, ideas, and opinions. Please review Ball State University's [Statement on Freedom of Expression](#), the resources on Ball State's [Freedom of Expression webpage](#), and [Ball State's Beneficence Pledge](#).

Title IX: Ball State University is committed to providing a safe and inclusive learning environment for all students. If you or someone you know has experienced sexual harassment—including sexual assault, dating violence, domestic violence, or stalking, please know that you are not alone. The University offers support services and resources. For more information or to report an incident, please visit bsu.edu/titleix or contact the Title IX Coordinator at 765-285-1545 or at titleix@bsu.edu. **As your instructor, I am a mandatory reporter under the Title IX policy and required to report any information I receive about possible sexual harassment.** This includes information shared in class discussions, assignments, or private conversations.

University Grade Appeal Policy: If you believe you received a final course grade that does not reflect your performance due to fairness or a procedural issue, you have the right to file an appeal within 5 school days after final grades are posted by the Office of the Registrar. Review the [University Grade Appeal Policy and Process](#).

Student Academic Ethics Policy: Honesty, trust, and personal responsibility are fundamental attributes of the university community. Academic dishonesty and other forms of academic misconduct threaten the foundation of an institution dedicated to the pursuit of knowledge and will not be tolerated. To maintain its credibility and reputation, and to equitably assign evaluations of scholastic and creative performance, Ball State University is committed to maintaining a climate that upholds and values the highest standards of academic integrity. Visit the VPAA's [academic integrity website](#) (Students tab) for resources on understanding academic integrity, citing sources properly, and avoiding inadvertent academic dishonesty. To learn about BSU's academic integrity expectations and students' rights, please read the University [Student Academic Ethics Policy](#).

Academic integrity violations include giving or receiving an unfair academic advantage (cheating), presenting someone else's ideas or work as your own (plagiarism), and falsifying academic records. Unless otherwise indicated, you must work independently by yourself. Check with me if you are unsure whether something constitutes academic dishonesty. Examples of academic integrity violations include but are not limited to:

- Using resources not authorized by the faculty member (including devices, AI tools, hidden notes, and open books)
- Using commercial study websites to find answers to graded assignments (Chegg, Course Hero, StudyPool, OneClass, etc.).
- Without the instructor's written permission, giving away, buying, or selling graded assignments class notes, exams, study guides, or other course materials to other students or to third-party vendors (Course Hero, Chegg, 24HourAnswers, etc.).
- Working with another person on any assignment other than authorized group projects.
- Sharing or allowing others to access your files, whether done with permission or not.
- Reusing your own work from another semester, course, or section.
- Sharing answers with others during exams (passing notes, texting, whispering, gesturing)
- Discussing exam questions and answers with students who have not taken the exam.
- Soliciting others to complete work for you.

This syllabus is subject to change in the event of extenuating circumstances.