Mayville State University

Math 323: Probability and Statistics

On Campus (34969)

Associate Professor Mary Townsend

MATH 323 (3 credits)

Office Location: CB 108 A **Office #:** (701) 788-4672 **Cell #:** (218) 779-2321

My preferred method of communication is e-mail at **mary.townsend@mayvillestate.edu**.

Campus mailing address: Mayville State University, 330 Third Street NE, Mayville ND 58257

Hours of Availability: Mondays and Wednesdays 10:00 – 10:50 a.m. and by appointment

Instruction Mode: Online Asynchronous /On Campus **Time Zone:** Central Standard Time (CST)

How to address your instructor: Ms. Townsend or Professor Townsend and pronouns: she/her.

Meeting Times and Location: Students will meet from 11:00 – 11:50 on campus MWF in CB 105.

Zoom Link: https://mayvillestate.zoom.us/j/83749690387

Course Description

This is a course beginning with the study of probability and continuing with the mathematical theory of statistics from the set theoretic point of view.

Pre-/Co-requisites: Math 103 College Algebra or equivalent (this could be Math 165 Calculus I)

Purpose of the Course

The purpose of MATH 323 is to acquaint the student with the general theory of probability and the procedures for applying this theory to problems involving statistical inference.

Required/Recommended Materials

OpenStax: Introductory Statistics (2013). Use this link **https://openstax.org/details/introductory-statistics** to download a free pdf copy of the textbook or get a print book with ISBN: 1-938168-20-8.

Online practice problems and graded homework will be available in myOpenMath at no expense to students.

Conceptual Framework

Learning occurs in many different situations including reading definitions and sample problems, solving problems, working independently and in groups, using technology, taking exams and quizzes, doing

practice problems and graded homework, answering questions in journals and reflecting on mistakes made in the process of learning to solve probability and statistical problems.

Course Objectives

This course addresses areas that have application in the economic, behavioral, social, and life sciences. Topics include relations and functions, solving equations and inequalities, determining real and complex solutions, exploring polynomial, rational, exponential and logarithmic functions and graphs of functions, an introduction to matrices and using Cramer's rule to solve linear equations. Students will also explore arithmetic and geometric series and sequences and learn to evaluate summations and write a series as a summation.

To successfully complete this course, the learner will be expected to meet the following objectives, as aligned to Mathematics and Composite Science Education Program Approval Standards through North Dakota's Education Standards and Practices Board (ND ESPB):

1. Students will be able to define key terms in statistics and probability.
2. Students will be able to identify and calculate descriptive measures appropriate to data.
3. Students will be able to calculate simple probability (binomial, geometric, hypergeometric, and Poisson distributions).
4. Students will be able to differentiate between discrete and continuous random variables and apply appropriate distributions.
5. Students will be able to apply the normal probability distribution.
6. Students will be able to apply and interpret the central limit theorem.
7. Students will be able to calculate sample size and confidence intervals.
8. Students will be able to conduct and interpret hypothesis testing and a single population.

Mathematics Education Course- ND ESPB Program Approval Standards Alignment:

- 11010.1 Mathematical Practices and Processes: The program requires the candidate to demonstrate the following: a. makes sense of problems and perseveres in solving them, b. reasons abstractly and quantitatively, c. constructs viable arguments and proofs, d. critiques the reasoning of others, e. uses mathematical models, f. attends to precision, g. identifies elements of structure, h. engages in mathematical communication
- 11010.2 Mathematical Connections: The program requires the teacher candidate to demonstrate the interconnectedness of mathematical ideas and how they build on one another. The candidate recognizes and applies connections among mathematical ideas and across various content areas as well as real-world contexts, using the language of mathematics to express ideas precisely, both orally and in writing to multiple audiences
- 11010.3 Secondary School Content Knowledge: The program requires the teacher candidate to demonstrate and applies knowledge of secondary mathematics concepts, algorithms, procedures, applications in varied contexts, and connections within and among mathematical domains (Complex Number System, Algebra, Geometry, Trigonometry, Statistics, Probability, Calculus, and Discrete Mathematics)
- 11010.4 Undergraduate Mathematics Content Knowledge: The program requires the teacher candidate to demonstrate and apply knowledge of the core mathematics content including calculus, axiomatic geometry, linear and abstract algebra, statistics, probability, and computer programming
- 11010.6 Instructional Tools: The program requires the teacher candidate to select and use appropriate instructional tools such as manipulatives and physical models, drawings, virtual environments, spreadsheets, presentation tools, and mathematics-specific technologies (e.g., graphing tools, interactive geometry software, computer algebra systems, and statistical packages); and makes appropriate decisions about when such tools enhance teaching and learning, recognizing both the insights to be gained and possible limitations of such tools

Science Education Course- ND ESPB Program Approval Standards Alignment:

- 13047.1 Composite Science Major/General Science The composite/general science program requires that environmental science be incorporated within other courses or as a separate course. The composite/general science program requires: 1. Coursework in biology, chemistry, physics, and earth science, including: a. Minimum of twenty four semester hours in one area. b. Minimum of twelve semester hours in two other areas. c. Minimum of four semester hours in the fourth area. d.

Courses must be from those that the institution allows toward graduation in the science major. 2. Study of mathematics through the pre-calculus level (college algebra and above) and statistics

Instructional Strategies

The instructor will provide an overview of each topic and provide examples to help students solve the assigned practice exercises, graded homework, journal questions, quizzes and to prepare for exams. Students are expected to participate in class discussions, online discussion boards and in pairs and small groups as they communicate with peers to answer journal questions, to provide additional sources of practice problems, and to practice teaching one another to master elementary mathematical concepts.

- Practice problems are available in Blackboard, myOpenMath, and Kahoot! to allow students to practice additional problems not included in the graded homework.
- Graded homework will be completed in Blackboard and Lumen to provide students several attempts to correctly solve each problem as they gain math mastery.
- Students will complete quizzes and Kahoot! quizzes in class to prepare for exam questions.
- Journal questions will be discussed in class, and students are encouraged to have at least two peers read their journal answers before submitting in Blackboard as they learn to communicate mathematical information orally and in writing. Students will journal regarding their learning in the course and the plan to master content.
- The instructor will provide detailed feedback on journals, quizzes, exams, and submitted work.
- The instructor is available by scheduled appointments, via e-mail and phone.

Expectations/Protocols

Becoming proficient in mathematics requires hard work and practice. Students are expected to take notes as they watch the PowerPoint presentations, to ask questions, to do practice problems, to solve graded homework problems, to thoughtfully write answers to journal questions, to discuss their journal answers in class and to submit professional answers to journal questions in Blackboard. Students are expected to communicate using proper mathematical notation and grammar in a legible manner as they show the steps used to determine solutions. Students will demonstrate mastery of concepts on scheduled exams and a proctored final exam.

Students are expected to display academic honesty and respect for themselves, their classmates, their instructor and the Mathematics department. For each unit, students should provide at least one discussion board entry and respond to at least two discussion board questions provided by peers. Students will be required to journal about their learning plans before each exam.

Critical thinking and problem solving will be an important part of this course. Students will read text and articles carefully. Students will work problems by showing the computations between the solution steps before discussing topics in class. There will be opportunities to practice doing problems in each section before completing journals, graded homework, and online quizzes. Students are encouraged to collaborate together as they learn to master the concepts. There will be opportunities for students to discuss topics in class and online with classmates and to journal about their progress with the instructor as students reflect on their learning and their plans to master concepts.

Students will:

- Read text, do practice problems in Blackboard and Lumen, attend class, and complete assigned activities.

- Complete graded assignments including quizzes, journals, and homework by designated due dates.
- Ask questions and participate in class and in online discussions via Discussion Boards.
- Discuss and present how to connect real world experiences to applications of probability and statistics.
- Prepare for exams by practicing problems and completing assigned work.
- Analyze results of practice problems, assigned work, and exams to learn from mistakes and gain mastery of content.

Instructor/Student Communication

Students may submit questions or concerns by e-mail at mary.townsend@mayvillestate.eduto to the instructor or schedule a time to meet with the instructor in person or by Zoom. Students can expect a reply to their e-mailed questions within 48 hours during the week and 72 hours over the weekend. Grading of exams, journals and discussion boards will typically be completed within 7 days of submission. Please e-mail the instructor if you have not received feedback for a submission from your proctor or in Blackboard. If you have questions about points deducted or how to solve problems with points deducted, you are encouraged to contact the instructor.

Method of Evaluation/Grading

Students will earn a course grade based on the higher percentage between their exam percentage and their Weighted Grade, which uses Exams (60%), Graded Homework (25%), Quizzes (10%), and Journals(5%). Suppose a student earns 78% on exams and 84% on the weighted grade; this student would earn a B (since 84% > 78%, and 84% > 80%). If a student earns 78% on exams and 40% on the weighted grade, this student would earn a C in the course (since 78% > 40%, and 78% > 70%).

Grading scale will be calculated as percentage of weighted averages:

A 90 -100% B 80 - 89.99% C 70 – 79.99% D 60 – 69.99% F 0-59.99%

- **Exams (100% or 60% as part of weighted grade):** Students will be graded on 3 unit exams each worth 100 points, and a comprehensive proctored final exam worth 200 points. This means that each unit exam will be 12% of your course grade and the final exam will be 24% of your course grade if the student uses the weighted grade option. If the student opts to use the exam percentage, each unit exam would be worth 20% of the course grade, and the final exam would be worth 40% of the course grade.
- **Graded Homework (25%):** Students will have the opportunity to practice problems before completing graded homework. Students may use notes and calculators when doing homework. Students are encouraged to work with a peer on homework (this means to help one another to become successful learning the content of each lesson—not having one student do all the work).
  - Students will complete graded homework in Blackboard and myOpenMath and on paper to prepare for quizzes and exams.
  - Students will need to do graffiti boards to show what they know about probability and statistics.
  - Students will provide an overview of how a journal article related to their major which uses statistics and statistical graphs and/or charts to convey the information. Students without a declared major may choose a topic related to a potential career option. This project will count as homework and as 20% of the last unit exam.
  - Students may earn a maximum of 110% in the graded homework category.

- **Quizzes (10%):** Students have the opportunity to work with a partner in class and online to do quizzes based on homework and Blackboard activities. Kahoot quizzes enable students to earn up to 110% overall on quizzes.
- **Journals (5%):** Students will be expected to set and achieve short-term goals throughout the course. Students will also journal about how they can connect real world experiences to applications of probability and statistics and reflect upon the presentations of these connections. Students will communicate to one another via discussion boards asking and answering questions related to course objectives. Students may earn up to 110% overall on journals with a few extra credit journal points available throughout the semester.

Enrollment Verification

The U.S. Department of Education requires instructors of online courses to provide an activity which will validate student enrollment in this course. The only way to verify that a student has been in this course is if he or she takes an action in the LMS, such as completing an assignment or a taking a quiz. Logging into the LMS is **NOT** considered attendance. Please see the enrollment verification activity and complete it by the date indicated. If it is not complete your enrollment in this course will be at risk. Completing the 6 Critical Questions journal, the syllabus quiz and the introduction forum will suffice as enrollment verification in this course. These are due the first week on Friday, 1/17/2025 at noon. Students who come to class on campus fulfill the enrollment verification requirements.

Proctor Notification

Since this course is on campus, exams will be on campus in CB 105 as scheduled.

In this course there will be two proctored one-hour exams; the third unit exam is a take home exam. There will also be a proctored 200-point comprehensive final exam. See the schedule for information about due dates for exams. Students may use an 8.5” x 11” notes sheet (two-sided) or two one-sided 8.5” x 11” notes sheets for each proctored unit exam. Students may use six (one-sided) pages or three (two-sided) pages of notes for the proctored final exam. Notes may include sample problems, problems from previous exams and/or homework, terms, etc.

Late Arrivals

The grading system for students adding this course after the first day of instruction will not be modified. Students will be graded on all the activities regardless of the date of enrollment in the course. Students will not be penalized for late assignments if enrollment occurs after the due date of the assignment, but the students are still responsible for completing the course material that was covered during their initial absence. Arrangements can be made for new due dates.

Starfish is the Student Success and Early Alert System

At Mayville State University Starfish will be used to report feedback on your academic performance, attendance, etc. If you receive a Starfish notification (sent to your @mayvillestate.edu e-mail from the Director of Student Success), please read it immediately.

As your instructor, I will send Kudos (messages of congratulations for doing great) or flags (messages of concern that you are not performing to expectations) using Starfish. Periodically, I will use Starfish to provide students with grade reports throughout the semester during the second week, before the final day to drop a course, and when other progress reports are due. You and your support team (your advisor, your athletic coach, the director of student success, and the other faculty who are teaching you this semester)

will be able to see these messages. You are also able to raise flags with "I have a question" or "I need help." You are also able to e-mail me directly with your questions at mary.townsend@mayvillestate.edu.

Important Student Information

Navigate to Blackboard > MaSU tab > Student Resources tab to find a document entitled, "Important Student Information," which includes information about:

- ✓ Land Acknowledgement Statement
- ✓ Academic Grievance Concerns and Instructor English Proficiency
- ✓ NetTutor - Online Tutoring Program
- ✓ Starfish - Student Success System
- ✓ Students with Documented Disabilities
- ✓ Student Learning Outcomes / Essential Learning Outcomes
- ✓ Academic Honesty
- ✓ Emergency Notification
- ✓ Continuity of Academic Instruction for a Pandemic or Emergency
- ✓ Family Educational Rights and Privacy Act of 1974 (FERPA)
- ✓ Diversity Statement (Title IX)

Students with Documented Disabilities

Students such as learning disabilities, orthopedic, hearing, visual, speech, psychological, ADD / ADHD, health-related or other disabilities may request accommodations to ensure full access to academic opportunities at Mayville State University. In order to receive these services, students must disclose their disabilities and request accommodations by providing documentation to the student success center. Any information shared will remain confidential.

Course Timeline/Schedule

The course timeline and schedule is a separate document in the Blackboard tab labeled "Syllabus, Schedule, myOpenMath Access, and Links to Textbooks". The course timeline and schedule are subject to change as deemed necessary by the instructor.

References/Bibliography

OpenStax. (2017). *Introductory Statistics*. OpenStax College, Houston, TX. ISBN-10: 1938168208 ISBN-13 978-1-938168-20-8. https://openstax.org/details/introductory-statistics