STAT 341 Intro to Probability and Statistics Fall 2019

This syllabus contains information about this class. Please read this carefully and keep it for future reference (in case you loose it, a copy of the syllabus will be posted on the class Moodle page). Please do not hesitate to ask me if you have questions. A good time for questions is right after class or during office hours.

CRN: 70088

Class Times: MWF 10:00 – 10:50 in Room 411 of the Health Sciences Building

Instructor: Rick Brown (Office: Math 011 – Math Learning Center)
Email: rick.brown@umontana.edu

Office Hours: Mondays: 11:00 – 12:00, Wednesdays: 11:00 – 1:00,
Thursdays: 10:00 – 12:00, Fridays: 11:00 – 12:00, and by appointment.
Email me any time to set up a time to meet!

Prerequisite: M 172 or M 182 (Calculus II) or M 162 (Applied Calculus)

Moodle Page: https://moodle.umt.edu/course/view.php?id=27878
This site will contain all information on this sheet plus more. Homework assignments and other information pertinent to this course will be posted on this web site, which will be updated frequently, so you should visit it regularly.

Text: *A First Course in Probability*, 8th edition, by Sheldon Ross, 2011 (ISBN 9780136033134). We will cover most of Chapters 1-4 of Ross plus selected material from other chapters or other sources. This book is recommended, not required.

Description: Offered autumn and spring. Probability, probability models and simulation, random variables, density functions, special distributions, and a brief survey of estimation and hypothesis testing. Computer use integrated throughout.

Communication: The primary way I will communicate with you outside of the classroom is through email. Please check your student email accounts daily.

Graphing Calculator: Recommended, but not required. You can use your favorite model, but I will give occasional instruction on how to use the TI-83/TI-84.

Learning Outcomes: The learning goals for this course are:

- Understand and use basic probability, counting and combinatorial methods, and Bayes' Theorem.

- Write formal proofs of basic results in set theory and probability.
- Use models for discrete and continuous random phenomena and be able to apply these models to real problems.
- Simulate random phenomena in R.

GRADING:

- HOMEWORK: There will be frequent homework assignments with a mix of online and written assignments. More information is below.
- MIDTERMS: There will be three "semi-cumulative" midterm exams. These are tentatively planned for September 25, October 23, and November 20.
- FINAL EXAM: There will be a cumulative Final Exam. It is scheduled for Thursday, December 12, 8:00 am – 10:00 am. The final exam score will replace your lowest midterm score if you perform better.

ASSESSMENT: 30% Homework
5% In-Class Activities
45% Midterm Exams (15% each)
20% Comprehensive Final Exam

GRADE SCALE:

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

MAKE-UPS: Make-ups for tests will be given under special and extenuating circumstances such as a family emergency or illness. It is your responsibility to notify me as soon as you know that you will miss any test and to make sure that a make-up is scheduled: if you are unable to contact me in person, then please send an email so that it will be convenient to get back to you in order to schedule a make-up. Early final exams will *not* be given.

HOMEWORK: Working hard on the homework is how you will succeed in this course, so please take the homework seriously. You may work with classmates on homework assignments, but you must write up your own solutions in your own words. There will be several components to your homework:

1. Written Homework Assignments: These are longer homework assignments that will be graded for correctness and will typically be due on Fridays. Homework is to be handed in as a hard copy. If you cannot be in class, you may email me the homework by that time (please do not email me the homework if you will be in class). I will drop your lowest homework score.

   Most of the problems in the written homework cannot be solved by simply plugging into a formula given in the book. They will require real problem-solving skills. Often there will be multiple ways to solve a problem. As on the tests, answers by themselves are not adequate without indicating your reasoning.

2. Online Homework Assignments: Homework assignments will sometimes include a component from a web-based homework system called WeBWorK which will immediately tell you whether your each answer is correct or not. These problems will generally be of the more routine calculation type. Usually, I will require you to do only a few of these problems, but I will post additional problems on each WeBWorK assignment so that you can get more practice if you feel you need it. It is important that you know how to do these more routine problems, but it is up to you on how much practice you need. To access this homework, go to the webpage https://lennes.math.umt.edu/webwork2 to bring up a login window. As your username, use your last name (lowercase); your initial password is the last 6 digits of your student ID (with no dashes). Please change your password after logging in the first time by clicking "Password/Email" from WeBWorK's Main Menu.

Late homework will generally be accepted up to one class late, but at a 50% grade reduction. The exception to this is homework due near the date of an exam, which will not be accepted late.

Some Important Dates: (See here for more.)

Aug.	26 (Monday):	First day Fall Semester instruction
Sep.	2 (Monday):	Labor Day: No Class
Sep.	4 (Wednesday):	Last day for students to add Autumn classes via CyberBear without consent of instructor.
Sep.	16 (Monday):	Last day to drop or change grading option from letter grade to Credit/No Credit or vice versa via Cyberbear.
Nov.	11 (Monday):	Veteran's Day: No Class
Nov.	27–29 (Wed-Fri):	Thanksgiving Break
Dec.	6 (Friday):	Last day Fall Semester instruction
Dec.	6 (Friday):	Last day for petitions to drop or change the grading option.
Dec.	12 (Thursday):	Final Exam, 8:00 am – 10:00 am.

Honesty: All students must practice academic honesty. Academic misconduct is subject to an academic penalty by the course instructor and/or a disciplinary sanction by the University. All students need to be familiar with the Student Conduct Code. The Code is available for review online at http://www.umt.edu/student-affairs/dean-of-students/default.php.

Accommodation: The University of Montana assures equal access to instruction through collaboration between students with disabilities, instructors and Disability Services for Students (DSS). If you think that you may have a disability adversely affecting you academic performance, and you have not already registered with DSS, please contact DSS in Lommassen 154. I will work with you and DSS to provide an appropriate accommodation.

TOPICS: Topics will include many (but not necessarily all) of the following (not in order):

- The Law of Large Numbers for probabilities
- Random walks
- Sample spaces, events and probabilities
- Random variables
- Expected value and the Law of Large Numbers for expected values
- Simulation in R
- Coincidences and rare events
- Conditional probability
- Chance trees and Bayes' rule
- The Monte Hall dilemma and related problems
- Discrete probability models: Bernoulli trials, binomial, geometric, Poisson and hypergeometric distributions
- Continuous probability models and probability density functions
- The normal distribution
- Variance and standard deviation
- Expected value and variance of linear combinations of random variables
- The square root law and the Central Limit Theorem
- Normal approximation to the binomial
- Confidence intervals for simulations: proportions and means
- Randomization tests
- Markov models