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STAT 216.00: Introduction to Statistics

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STAT 216: INTRODUCTION TO STATISTICS

UNIVERSITY OF MONTANA
FALL, 2021

ABOUT THE COURSE

"Statistics" is often associated with a particular kind of mathematical *content* to be learned—vocabulary, symbols, formulas, etc. In this course, we will explore what it means to think about statistics as a *way of making sense of the world*.

LEARNING OUTCOMES

STAT 216 satisfies the general education mathematics literacy requirement. Upon successful completion of STAT 216, a student will be able to apply effectively statistical reasoning to a variety of applied or theoretical problems, including:

1. be able to describe distributions numerically, graphically, and verbally.
2. be able to use and interpret a linear model for the relationship between two variables
3. know the basic principles of good experimental design and good sampling design
4. know the fundamental ideas of statistical inference for means and proportions including both hypothesis testing and confidence intervals.
5. be able to interpret confidence intervals and p-values in the context of real problems.
6. be a critical consumer of statistical studies reported in the media.

QUICK LINKS

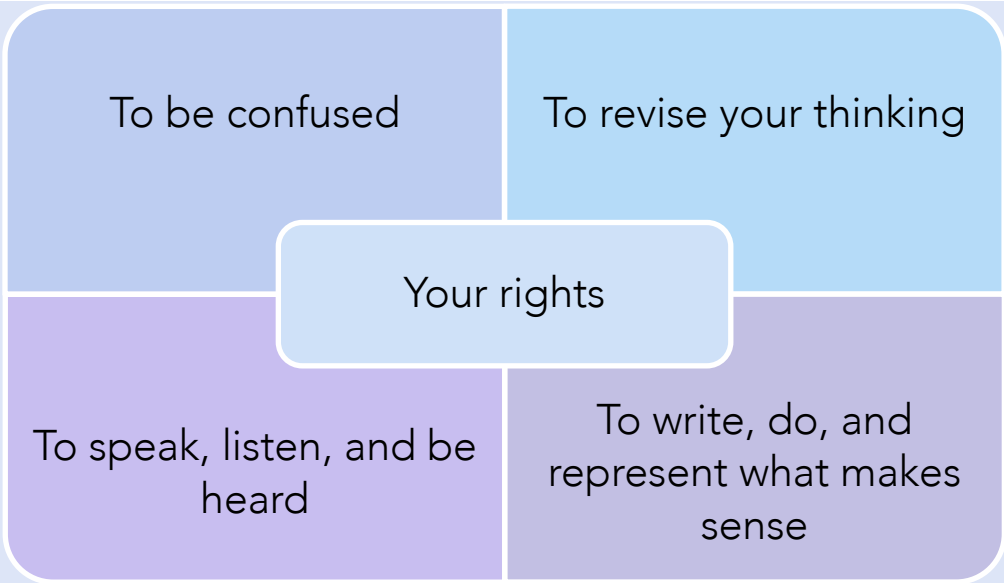
Textbook: https://bookdown.org/frederick_peck/textbook_-_2021_f/

Class Activities: https://student.desmos.com/

Zoom link for lecture: https://umontana.zoom.us/j/91025993112?pwd=aXpIUjY3K3ZDd0M3citqemc2cW9XZz09

Remote recitation: https://umontana.zoom.us/j/98997374798?pwd=NkR4Zytja0dUdVVNYUZnbktwV1kxUT09

YOUR RIGHTS



YOU HAVE THE RIGHT TO BE CONFUSED. Being confused is actually a good thing. Feeling confused is an important part of learning. If you are confused, don't try to hide it. Exercise your right! Say, "I don't understand this… yet."

YOU HAVE THE RIGHT TO REVISE YOUR THINKING. Nothing is set in stone. You may notice that you made a mistake. Claim it! You may get some feedback. Respond to it! Learning is a process and revision is an important part of that process.

YOU HAVE THE RIGHT TO SPEAK, LISTEN, AND BE HEARD. Learning and doing statistics is a social enterprise. We will offer multiple ways for you to communicate and collaborate with others.

YOU HAVE THE RIGHT TO DO ONLY WHAT MAKES SENSE. Math should make sense. If you find yourself doing something, but you can't really explain why, then claim your right and stop. Do what makes sense to you. This is not to say that anything goes. You may get some feedback which causes you to revise your thinking. This also means that you have the right to use words and symbols that make sense to you. We will introduce new vocabulary and symbols in this class, and we'll help you learn to use them. As you are learning, please use language that makes sense to you.[1]

[1] These are based on work by Olga Torres (https://www.youtube.com/watch?v=_UndpNUCAqw) and Crystal Kalinec-Craig (https://embracinglifewithmajorrevisions.org/rights-of-the-learner-blogs/)

COURSE FORMAT

Education researchers have spent decades studying how people learn math and statistics. The research is clear: we learn more when we are actively engaged than when we are passively listening to a lecture. Therefore, lectures will involve "active learning" including activities and discussion.

> Be prepared to do activities and participate in a group during lecture and recitation!

Most of our work will be done on computers. Please bring an internet device to class. A Mac or PC laptop is best, but if you don't have one that's okay.

Attendance is mandatory in lectures and recitation. Please make sure that you can fully participate in live, interactive sessions. If you are not able to join in-person, there are remote options as described below.

LECTURES

TIME: MWF 10-11

LOCATION: Urey Lecture Hall and via Zoom (see below).

Due to the COVID pandemic, I understand that some people are not able to join our lectures in person. If you need to join via zoom, that is okay.

Zoom link for lecture:
https://umontana.zoom.us/j/96606343125?pwd=d0lneGtaZmptZkJYQWdKWU9zREN6Zz09

RECITATION/LAB

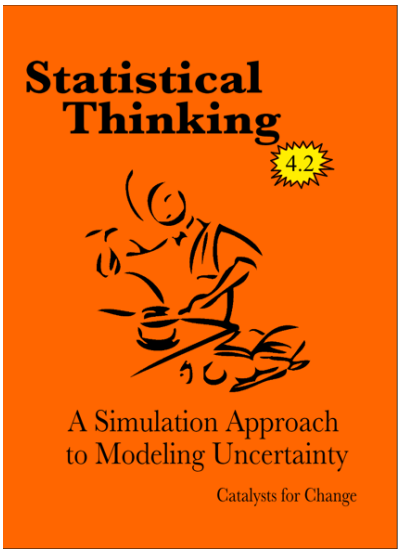
Recitation/lab sections meet on Thursdays. You can find the recitation section that you are registered for in CyberBear.

If you are not able to attend an in-person recitation section, please register for the remote section, R09 (CRN: 76273).

Zoom link for remote recitation section:
https://umontana.zoom.us/j/98997374798?pwd=NkR4Zytja0dUdVVNYUZnbktwV1kxUT09

Fred Peck (he/him) 	**Contact:** frederick.peck@umontana.edu **Office hours:** • Mon 11-12 in Math 201 • We can meet anytime. Schedule at www.fapeck.com/meeting
Ian Derickson (he/him) 	**Contact:** ian.derickson@umontana.edu **Office hours:** • Weds 11-12 in Corbin 356 • Or set up an appointment by email: ian.derickson@umontana.edu
Jared Gibbs (he/him) 	**Contact:** jared.gibbs@umontana.edu **Office hours:** • Thurs 3-4 in Corbin 266 • Or set up an appointment by email: jared.gibbs@umontana.edu
Jake Oetinger (he/him) 	**Contact:** jakob.oetinger@umontana.edu **Office hours:** • Fri 11-12 in Math Learning Center • Or set up an appointment by email: jakob.oetinger@umontana.edu
Riley Watt (he/him) 	**Contact:** riley.watt@umontana.edu **Office hours:** • Weds 1-2 via zoom: https://umontana.zoom.us/j/91375740856 • Or set up an appointment by email: riley.watt@umontana.edu

TEXTBOOK



We will use a customized version of the book, *Statistical Thinking: A simulation approach to modeling uncertainty.*

The book is available for free at:
https://bookdown.org/frederick_peck/textbook_-_2021_f/

SOFTWARE

We will use the following software and websites:

- TinkerPlots: We will use TinkerPlots for all of our statistical analysis. You will need to buy a copy of this software. You can buy a 1-year license for $7 or a "never expires" license for $20. Download and buy at: http://www.tinkerplots.com. (TinkerPlots is also installed on the PCs in the library lobby.)
- Zoom: If you plan to join remotely, please be sure that you have the most recent version of Zoom installed. Download at https://zoom.us/download
- Moodle: http://moodle.umt.edu We will use Moodle as our "central meeting place." Assignments, data sets, handouts, etc. will be posted there. Please plan to check the Moodle site often.
- Desmos: https://student.desmos.com Most in-class activities will be done through Desmos. We'll provide access and usage instructions in class.

COURSE ACTIVITIES AND DELIVERABLES

READINGS: Occasionally we will have readings from the textbook. Readings should be completed before the class for which they are assigned.

IN-CLASS ACTIVITIES AND DISCUSSION: Education researchers have spent decades studying how people learn math and statistics. The research is clear: we learn more when we are actively engaged than when we are passively listening to a lecture. Therefore, lectures and recitations will involve "active learning" including activities and discussion.

- We do not expect that you will "know" how to do every activity. In many cases, you won't! That's because we will often ask you to engage in activities in order to learn something new.
- We do expect that you will engage deeply and thoughtfully in class activities, and that you exercise all of your rights as a learner.

PRACTICE, EXTENSION, AND PREPARATION (PEP) ACTIVITIES: PEP activities are done outside of class. You can work together on the PEP activities and use any resources that are helpful.

PPE activities are basically a sandbox: a place for you to try things out and see how they work. They are not graded for accuracy, only effort. The key is to try things out and to learn from your experience.

In order for PEP activities to contribute to your learning:

→ *You have to engage thoughtfully with every problem.* Some problems may be challenging! You may be confused! That's okay! Remember, you have the right to be confused. The activities are a sandbox, a place to play. They are not an evaluation.

→ *You have to get some feedback.* We will post *instructor solutions* for each set of PEP activities. To get feedback, you will correct your own assignments, including making notes to yourself.

→ *You have to get help.* If, after getting feedback, you are still confused about something, congratulations! This is a very important part of learning. They key is that, when you are confused, you seek help. You can get help from any instructor. Office hours are posted on Moodle.

PEP activities are assigned on Fridays, and corrected responses are due at midnight the following Wednesday. Please submit your corrected responses to Moodle on Weds. nights, and bring a copy to your recitation sections on Thursday.

CHECK-INS: Each Friday, we will have online check-ins. The point of a check-in is to give you and us feedback on your participation and on how you are understanding the concepts that week.

- You can use any resources you want on your check-ins, but you should please complete them by yourself.

STATISTICAL INVESTIGATIONS: Investigations are the primary means by which we will assess your statistical reasoning. There are four statistical investigations, one for each unit. The investigations are due on the Wednesday after the end of the unit ends (there will not be any PEP activities that week). We will provide more information about investigations later in the course.

- You may use any resources, including other people, to help you with your investigations.
- Remember, you have the right to revise your thinking. You may revise and resubmit your investigations for full credit, based on feedback.

GRADING

You grade is based on the following:

- Participation in course activities (50%)
  - Attendance and participation in lectures and recitations (20%)
  - Thoughtful completion of PEP activities (30%)
- Content (50%):
  - Check-ins (5%)
  - Investigations (45%)

Letter grades will be assigned based on the standard 90-80-70 scale. Because you have the right to revise, your grade is literally in your hands.

HELP!

HELP WITH COURSE CONTENT: Confusion is part of learning. The key is not to avoid confusion, but to embrace it, and to get help.

We are here to help!

The best way to get help in this course is to meet with an instructor. You can attend the office hours of any of the instructors. Up-to-date office hours are posted on Moodle. You can also schedule a meeting with any instructor at a time that is convenient for you.

> You can ask any of us for help and attend any of our office hours!

HELP WITH TECHNOLOGY:

- For help with Zoom: Contact the IT Help Desk at 406-243-HELP or ithelpdesk@umontana.edu. Hours are 8AM-5PM, M-F.
- For help with Moodle: Contact the UMOnline Help Desk at 406-243-4999 or 866-225-1641 (toll-free) or umonline-help@umontana.edu.Hours are 8AM-5PM, M-F.

OTHER POLICIES

COMMUNICATING: Email is the best way to reach your instructors. UM policy states that we must use your UM email account when we correspond with you. Please email us from your UM account—that makes it easy to follow the policy! Even if you don't, we still have to reply to your UM account.

CLASSROOM AND TESTING ACCOMMODATIONS: The University of Montana assures equal access to instruction through collaboration between students with disabilities, instructors, and the Office for Disability Equity (ODE). If you anticipate or experience barriers based on disability, please contact the ODE at: (406) 243-2243, ode@umontana.edu, or visit www.umt.edu/disability for more information. Retroactive accommodation requests will not be honored, so please, do not delay. As your instructor, I will work with you and the ODE to implement an effective accommodation, and you are welcome to contact me privately if you wish.

ACADEMIC HONESTY: All students need to be familiar with the Student Conduct Code. You can find it in the "A to Z Index" on the UM home page. 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.

CULTURAL, FAMILY, AND HEALTH LEAVE: Please know that we understand that you are a human and that you have a life and responsibilities outside of this course. We will work with you to make sure that you can participate in or attend to any out of class responsibility you have.

FOOD AND HOUSING INSECURITY: Any student who faces challenges securing food or housing, and believes that this could affect their performance in this course, is urged to contact any or all of the following campuses resources:

Food Pantry Program: UM offers a food pantry that students can access. For more information about this program, email umpantry@mso.umt.edu, visit the UM Food Pantry website (www.umt.edu/pantry) or contact the pantry on social media (@pantryUm on twitter, @UMPantry on Facebook, um_pantry on Instagram).

ASUM Renter Center: The Renter Center has compiled a list of resources for UM students at risk of homelessness or food insecurity: https://medium.com/griz-renter-blog. Students can schedule an appointment with Renter Center staff to discuss their situation and receive information, support, and referrals.

TRiO Student Support Services: TRiO serves UM students who are low-income, first-generation college students or have documented disabilities. TRiO services include a textbook loan program, scholarships and financial aid help, academic advising, coaching, and tutoring. Students can check their eligibility (www.umt.edu/triosss/apply.php) for TRiO services online. If you are comfortable, please come see members of the teaching team. We will do our best to help connect you with additional resources.

OUR COLLECTIVE RESPONSIBILITY TO PROMOTE PUBLIC HEALTH

We are experiencing a global pandemic. We are called upon to engage in practices to promote collective wellbeing and public health.

- Mask use is required within the classroom or laboratory.
- If you feel sick and/or are exhibiting COVID-19 symptoms, please don't come to class and contact the Curry Health Center at (406) 243-4330.
- If you are required to isolate or quarantine, you will receive support in the class to ensure continued academic progress.
- UM recommends students get the COVID-19 vaccine. Please direct your questions or concerns about vaccines to Curry Health Center.
- A seating chart will be used to support contact tracing efforts.
- Class attendance and seating will be recorded to support contact tracing efforts.
- Drinking liquids and eating food is discouraged within the classroom.
- Mask use is required in vehicles when traveling to field sites as part of class/fieldwork.

Let's all care for each other.

A FINAL NOTE: THE IMPORTANCE OF OUR COLLECTIVE WELLBEING

This is a challenging and uncertain time for all of us. Even as we gather together to learn statistics, our priority is our collective wellbeing. Please act gracefully and patiently with each other. We may experience sudden changes. We will have to face these changes with grace, understanding, and flexibility. If you experience life challenges that get in the way of your participation in the class, please let us know. We promise to be understanding and to work with you. Again, our priority is your physical and emotional health.