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STAT 216.14: Introduction to Statistics

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STAT 216 - Introduction to Statistics – Syllabus Spring 2018

Course Coordinator

- **Cindy Leary (cindy.leary@mso.umt.edu)**
  Office: Math 214

STAT 216 on Moodle: All information for this course will be posted on Moodle. Here you will find all handouts given in class and all notes covered during lecture. This includes all lab worksheets, "hand-in" homework assignments, and the solutions to all assignments. The lecture notes have significant amounts of material intentionally omitted so that we may cover this material during class. If you miss a class, check Moodle for any announcements made that day, and copy the notes from a classmate. I will not provide you with copies of notes you missed. A course pack containing the blank notes is available in the bookstore.

Course Format: 3 lectures/week: MWF 9:00-9:50 or 10:00-10:50am, North Underground Lecture Hall (NULH 101). 1 discussion/lab section per week: Thursday at the times listed below. Attendance at discussion sections is mandatory.

Prerequisites: M 115 (Probability and Linear Mathematics, previously labeled MATH 117), or 3 or more credit math course numbered 121 or above.

Stat 216 Discussion Sections:

9:00am Lecture

Section	Time	Room	Instructor
1	9:00	MA 312	Jared Halvorson
2	10:00	MA 312	Jared Halvorson
3	11:00	MA 312	Benjamin Stark
4	12:00	MA 312	Benjamin Stark
5	1:00	MA 312	Daniel Barthelmeh

10:00am Lecture

Section	Time	Room	Instructor
11	8:00	MA 103	Ted Owen
12	9:00	MA 103	Ted Owen
13	10:00	MA 103	Daniel Barthelmeh
14	11:00	MA 103	Rick Brown
18	11:00	LA 235	Quy Cao
15	12:00	MA 103	Rick Brown
16	1:00	MA 103	Dominika Dec
17	2:00	MA 103	Dominika Dec

Stat 216 Instructors: You may go to ANY of these instructors for help during their office hours, which will be posted on Moodle.

Name	Office	Email
Cindy Leary	Math 214	cindy.leary@mso.umt.edu
Rick Brown	Corbin 355	rick.brown@umontana.edu
Daniel Barthelmeh	Corbin 359	daniel.barthelmeh@umontana.edu
Quy Cao	Corbin 367	quy.cao@umontana.edu
Dominika Dec	Corbin 357	dominika.dec@umontana.edu
Jared Halvorson	LA 409	jarod.halvorson@umontana.edu
Ted Owen	Corbin 367	theodore.owen@umontana.edu
Benjamin Stark	Corbin 358	benjamin.stark@umontana.edu

Learning Outcomes: Upon successful completion of STAT 216, a student will:
1. be able to describe and explore sets of data both numerically and graphically.
2. know how to use the normal model for the distribution of a single variable and the linear regression 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.

Computing Information: **StatCrunch** statistical software will be used by the instructors during class and will also be required for some homework problems throughout the course. This software can be accessed within MyStatLab.

Learning Catalytics: is a cloud-based learning and assessment system that we will use during the lecture portion of this course. It is available through a link in Moodle, but in order to access it, you will need to have a device that can connect to the wireless internet in the lecture hall. A device such as a smartphone, tablet, or laptop would work well. This technology allows me to assess your understanding of the material, make the course more engaging, and collect data for our class to analyze. Your responses will also constitute a portion of your grade (5%). Your Learning Catalytics grade will be primarily be based attendance. While these responses are worth 5% of your grade, you also have the option of using your overall exam average as your Learning Catalytics grade.

Note: If you are ever unable to connect to the Learning Catalytics page during class, you may email me your responses <u>during class.</u> Emails received after the end of class will not be included in your Learning Catalytics grade. Note also that we drop your five lowest Learning Catalytics grades.

Textbook: Intro Stats (4th ed. Custom), by DeVeaux, Velleman, & Bock. You automatically have access to the online textbook and resources through Moodle (unless you choose to ``opt out'' of the tuition billing system). If you would additionally like to purchase a underline printed copy of the book (for $20), please go to: http://www.mypearsonstore.com/stores/STAT216\\   You will also need the username: **pearson** and password: **welcome**

Calculators: Since Math 115 is a pre-requisite for this course, it is expected that you already own a calculator suitable for this class and that you also know how to use it. Your calculator should, among other things, be able to calculate probabilities from the Binomial, Normal, and t-distributions. If you are thinking about purchasing a calculator for this course, students tend to be the most comfortable with the TI-83 or TI-83 Plus. A list of other calculators is provided on the Moodle course page. Please note that calculators with a QWERTY keyboard, smart watches, and cell phones are not allowed for use during exams.

Incomplete (I) Grades: Incompletes (I's) are given at the discretion of the course coordinator (Cindy Leary) only. See the 2017-2018 UM catalog for the conditions under which an "I" may be given.

Credit/No-Credit Grades: A D- grade is required to receive credit under the Credit/No-Credit option. You will be allowed to change your grading option from Credit/No Credit to Traditional or vice versa up until May 4th.   Note: A course taken to meet a general education requirement (such as Stat 216) CANNOT be taken as Credit/No Credit. See the 2017-2018 UM course catalog for more information.

Grading: Your overall percentage for the course will be computed using the weights below. We will also drop some of your lowest scores as indicated in the table. The +/- grading system will be used to assign final grades. There is no strict grading scale for this course; however, the table below indicates the worst-case scenario for the letter grade breakdown. For example, if you earn an 80% in the course, you are guaranteed no worse than a B-, and it could be higher. No extra credit will be available.

Grade Category	Weight	# Dropped
MyStatLab Homework	10%	2
Hand-in Homework	8%	1
Learning Catalytics (or Exam Avg)	5%	5 Days
Worksheet/Lab Grade	8%	1
Exam #1	23%	0
Exam #2	23%	0
Exam #3/Final Exam	23%	0

Grade	A- to A+	B- to B+	C- to C+	D- to D+	F	CR (Credit)
%	90-100	80-89	68-79	57-67	Less than 57%	57-100

"Hand-in" Homework: Weekly assignments will be posted on Moodle as a Word document. It is expected that you type the answers into this document or <u>neatly</u> write in your work when appropriate. This course largely focuses on teaching you how to interpret and analyze data. We expect you to use correct grammar and spelling while providing clear and concise explanations. These assignments will be handed in at the beginning of your lab on Thursdays.   NO LATE HOMEWORK WILL BE ACCEPTED FOR ANY REASON. We will not regularly accept homework assignments via e-mail, but you may e-mail an assignment if you are sick and cannot make it to campus, with the approval of Cindy Leary. Homework is not only a fairly substantial portion of your grade, but it is vital to your success in this class. Working with other students on homework is allowed and encouraged, as long as you hand in your own work, and do not simply copy someone else's work. Solutions to all problems from each assignment will be posted on Moodle.

OnlineHomework: You will access your online homework problems and other textbook resources through Moodle (MyStatLab). To initially gain access to this system, use the informational document posted at the top of our Moodle page. Once you go through this initial login procedure, you will automatically have access to MyStatLab resources for the rest of the semester. Any online assignments completed after the due date will only receive 50% of the total points earned.

Recommended Problems: Additional recommended problems will be assigned but not collected from each chapter, with answers provided in the back of the textbook. You are encouraged to work all of these problems.

Labs/Worksheets: During the discussion sections, you will have the opportunity to ask questions about course material and work on problems with other students in small groups. You will complete a worksheet most weeks during the discussion section. The intent of the worksheets is to have you practice using statistical methods and to promote cooperative learning. Completing the worksheets in groups will allow you to discuss ideas and problems with other students. Your worksheet grade will reflect both your own work and the work of your group. ***** Make-up worksheets will usually not be given, but notify Cindy if you are unable to attend your lab due to a UM-sponsored activity.**

Tests:
There will be 2 **<u>evening</u>** tests during the semester given in NULH and Urey lecture halls.

- Test #1, Thursday, March 1st, 6:00-7:30pm
- Test #2, Thursday, April 5th, 6:00-7:30pm

You **must** take the test in your assigned location and time. More will be said about the exams at a later date. If you cannot make it to an exam, you must let me know <u>BEFORE</u> the exam is given. No make-up exams will be given without a <u>documentable</u> reason for missing the exam.

Final exam: The final exam will emphasize later material but will also cover some of the key elements from earlier chapters. The final exam will take place on **Tuesday, May 8th** for the 9am lecture and **Wednesday, May 9th** for the 10am lecture. Both exams will be given from 10:10am to 12:10pm. Makeup exams will not be given due to travel plans.

Study Advice: COME TO CLASS! STUDY THE NOTES! BE AN ACTIVE LEARNER! Read through the notes to be covered **before** coming to class and review them after class. Either print the notes from Moodle or purchase a course pack from the bookstore. This will reduce the volume of notes you will need to take in class and you will get more out of the lecture. Read the textbook to solidify your understanding of the topics introduced during lecture. Doing your homework as well as the additional recommended problems **conscientiously** will greatly increase your chance of success in this class. There will be **STUDY JAM** sessions held most Monday and Wednesday evenings in the U.C. commons (6:30pm-9:00pm). ****Plan to spend 2 hours outside of class for each hour of class – Seriously!****

Adding/Dropping the Course: January 30th is the deadline for students to drop or change a grading option via CyberBear. February 9th is the deadline for students to drop/add a course or change the grading option using a course add/course change form. After this date, a student is allowed to make changes by petition. The final deadline for any and all changes is May 4th. These policies are listed in the UM catalog at http://www.umt.edu/catalog.

Students with disabilities: Students with disabilities may request reasonable modifications by contacting Cindy Leary. The University of Montana assures equal access to instruction through collaboration between students with disabilities, instructors, and Disability Services for Students (DSS). ``Reasonable'' means the University permits no fundamental alterations of academic standards or retroactive modifications. For more information, please consult http:www.umt.edu/disability.

Academic Misconduct: All students must practice academic honesty. Academic misconduct is subject to an academic penalty by the course instructor and/or disciplinary sanction by the University. This includes, but is not limited to, copying answers on homework assignments, cheating on exams, and any type of dishonesty in your work. All students need to be familiar with the Student Conduct Code. The Code is available for review online at http://www.umt.edu/vpsa/policies/student_conduct.php

Tentative (Optimistic) Schedule

Date	Day	Chapter	Topics Covered (Tentative!!)
1/22	Monday	1	Course Introduction, Data
1/24	Wednesday	2	Categorical Data, StatCrunch demo
1/26	Friday	2	Categorical Data Displays & Distributions
1/29	Monday	3	Displaying & Describing Quantitative Variables
1/31	Wednesday	3	Displaying & Describing Quantitative Variables
2/2	Friday	3	Mean and Standard Deviation
2/5	Monday	4	Comparing Distributions, Boxplots
2/7	Wednesday	5	z-scores
2/9	Friday	5	Normal Model and the Empirical Rule
2/12	Monday	5,6	More on Normal Models, Scatterplots
2/14	Wednesday	6	Scatterplots, Correlation
2/16	Friday	6,7	Correlation vs Causation, Linear Regression
2/19	Monday		President's Day – No class
2/21	Wednesday	7	Linear Regression
2/23	Friday	7,8	Linear Regression, Residual Analysis, & R^2
2/26	Monday	8	Regression Wisdom, Outliers, Influential Points
2/28	Wednesday	8	Transformations in Regression
3/1	Thursday		**EXAM 1 from 6:00pm to 7:30pm**
3/5	Monday	9	Randomness, Simulation
3/7	Wednesday	10	Sample Surveys, Simple Random Samples
3/9	Friday	10	More Sampling Designs
3/12	Monday	11	Observational Studies, Experimental Design
3/14	Wednesday	11	More on Experimental Design
3/16	Friday	12	Randomness & Probability, Law of Large Numbers
3/19	Monday	15(Skip13,14)	Sampling Distribution of $\hat{p}$
3/21	Wednesday	15	Central Limit Theorem (CLT) for $\hat{p}$
3/23	Friday	15,16	CLT, Confidence interval for p
3/26 to 3/30			SPRING BREAK
4/2	Monday	16	Confidence Intervals for p
4/4	Wednesday	16	Confidence intervals for p
4/5	Thursday		**EXAM 2 from 6:00pm to 7:30pm**
4/9	Monday	17	Hypothesis Testing for p, P-values
4/11	Wednesday	17	Hypothesis Testing for p, P-values
4/13	Friday	17	Hypothesis Testing examples
4/16	Monday	15	CLT for means
4/18	Wednesday	15,18	Inferences about means, t-procedures
4/20	Friday	18	Inferences about means, t-procedures
4/23	Monday	18	Inferences about means, t-procedures
4/25	Wednesday	19	More about tests, P-values, Type I & Type II errors
4/27	Friday	20	Comparing two proportions
4/30	Monday	20	Comparing two proportions
5/2	Wednesday	20	Comparing two means
5/4	Friday	20	Putting all Inference Procedures Together
5/8	Tuesday		**FINAL EXAM FOR 9am LECTURE (10:10am)**
5/9	Wednesday		**FINAL EXAM FOR 10am LECTURE (10:10am)**