

**College of Liberal Arts and Sciences  
University of Iowa  
Fall 2024**

**Title of Course:** Elementary Statistics and Inference  
STAT:1020 / PSQF:1020 Lecture Section B

**Course meeting time and place:** 9:30 – 10:20 am M, W, F; 3655 SC

**Department of Statistics and Actuarial Science:** <https://stat.uiowa.edu/>

**Course ICON Site:** To access the course site, log into [Iowa Courses Online \(ICON\)](#) using your Hawk ID and password.

### Course Home

The College of Liberal Arts and Sciences (CLAS) is the home of this course, and CLAS governs the add and drop deadlines, the “second-grade only” option (SGO), academic misconduct policies, and other undergraduate policies and procedures. Other UI colleges may have different policies. Questions may be addressed to 120 Schaeffer Hall, or see the [CLAS Academic Policies Handbook](#)

**Instructor:** Dr. Ankenmann  
**Office location:** S316 LC  
**Office hours:** 11 am – 12 noon, M, W, F, or by appointment; S316 LC  
**E-mail:** [robert-ankenmann@uiowa.edu](mailto:robert-ankenmann@uiowa.edu)  
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Discussion	B21	8:30 – 9:20 am	T	51 SH
Sections	B23	11:00 – 11:50 am	T	71 SH
	B22	8:30 – 9:20 am	Th	51 SH
	B24	11:00 – 11:50 am	Th	71 SH
Office Hours		9:30 – 11:00 am	T & Th	257 SH

### Course Description

This course provides an overview of the logic and techniques involved in quantitatively analyzing and interpreting empirical data. Methods for displaying data graphically and for describing characteristics of data will be covered in the first part of the course dealing with descriptive statistics. The second part of the course includes topics in elementary probability theory and sampling, forming a basis for techniques of statistical inference. The problem of inference, attempting to make generalizations that go beyond the data at hand, is the focus of the third part of the course.

### Learning Objectives

This is a *General Education* course in *Quantitative or Formal Reasoning*. Courses approved in this area have as their primary purpose the development of the analytical powers of the student as they might be exercised in presentation and evaluation of mathematical or other formal symbolic systems. Students will learn and practice methods of statistical reasoning. Students

will also learn to evaluate arguments made in the symbolic system embodied in the course, and will become familiar with its major concepts and ways of formulating questions.

### Textbook/Materials

The required textbook for this course is an E-text:

- Intro Stats, 6<sup>th</sup> Edition
- E-text ISBN: 9780136806905, 0136806902
- Richard D. De Veaux; Paul F. Velleman; David E. Bock
- Pearson
- 2022



- You can get to the E-text (and a variety of other tools) from the **MyLab Statistics** Module on the ICON course website
- Handouts for lectures and discussion sections, as well exam review questions and answers/solutions, will be posted on the ICON course website

### Academic Honesty and Misconduct

All students in CLAS courses are expected to abide by the [CLAS Code of Academic Honesty](#). Undergraduate academic misconduct must be reported by instructors to CLAS according to [these procedures](#). Collaboration among students is permitted on homework assignments. Students must work alone on all three exams.

### Student Complaints

Students with a complaint about a grade or a related matter should first discuss the situation with the instructor and/or the course supervisor (if applicable), and finally with the Director or Chair of the school, department, or program offering the course. Students should contact [CLAS Undergraduate Programs](#) for support when the matter is not resolved at the previous level.

### Drop Deadline for this Course

You may drop an individual course before the deadline; after this deadline you will need collegiate approval. You can look up the [drop deadline for this course](#) here. When you drop a course, a “W” will appear on your transcript. The mark of “W” is a neutral mark that does not affect your GPA. Directions for adding or dropping a course and other registration changes can be found on the [Registrar’s website](#). Undergraduate students can find policies on dropping and withdrawing [here](#).

## Course Requirements

- readings (see **Lecture Schedule** for textbook chapters and topics)
- exercises from textbook (for self study, and for review in discussion sections with the TA); see **Recommended Textbook Exercises**
- students are expected to attend all lectures and discussion sections
- 10 graded homework assignments; see **Graded Homework Assignment Schedule** (below) for deadlines
- 3 exams (open book), each consisting of 30 multiple-choice questions; see **Exam Schedule** (below) for dates, times, locations, and content coverage; review questions and answers/solutions will be posted on ICON at least one week before each exam; exams are based on content covered in textbook readings, lectures, discussion sections, graded homework assignments, recommended textbook exercises, and review questions posted on ICON

## Course Grades

Final grades are based on the best 9 out of 10 homework assignments (approximately 2.78% each; 25% altogether), and three exams (25% each).

### Grading System and the Use of +/-

Final grades will be awarded based on the following ranges:

<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>	<u>F</u>
A+ 96 – 100	B+ 79 – 83	C+ 62 – 66	D+ 45 – 49	F 0 – 34
A 89 – 95	B 72 – 78	C 55 – 61	D 40 – 44	
A- 84 – 88	B- 67 – 71	C- 50 – 54	D- 35 – 39	

- these are **guaranteed cutoffs** so it's possible, but unlikely, that everybody receives a grade in the A range
- with this grading system **you are NOT graded on a curve**, so you aren't competing against other students
- students with an average homework assignment score exceeding 75% (based on the best 9 out of 10 homework assignments) will be eligible for borderline grade consideration for final grades (for example, if a student has an overall score of 66, and their average homework score is at least 75%, their grade would move from C+ up to B-)
- absence from an exam must be cleared with Dr. Ankenmann on or before the exam date
- any student who is absent from an exam must submit a completed *Absence Explanation Form* to Dr. Ankenmann before being allowed to take a make-up (see [https://registrar.uiowa.edu/sites/registrar.uiowa.edu/files/wysiwyg\\_uploads/absence\\_explanation\\_form2019revised.pdf](https://registrar.uiowa.edu/sites/registrar.uiowa.edu/files/wysiwyg_uploads/absence_explanation_form2019revised.pdf))
- any unexcused absence from an exam will result in a score of zero with no opportunity for a make-up

## Date and Time of the Final Exam

The final examination date and time will be announced by the Registrar generally by the fifth week of classes and it will be announced on the course ICON site once it is known. **Do not plan your end of the semester travel plans until the final exam schedule is made public. It is your responsibility to know the date, time, and place of the final exam.** According to Registrar's final exam policy, **students have a maximum of two weeks after the announced final exam schedule** to request a change if an exam conflict exists or if a student has more than two exams in one day (see the [policy](#) here).

## Calendar of Course Assignments and Exams

<b>Graded Homework Assignment Schedule</b>	HW Assignment 1	Sept 11, 11:59 pm	Chapters 1, 2.1 – 2.3
	HW Assignment 2	Sept 18, 11:59 pm	Chapters 2.4, 2.5, 3
	HW Assignment 3	Sept 25, 11:59 pm	Chapters 3, 4
	HW Assignment 4	Oct 2, 11:59 pm	Chapter 5
	HW Assignment 5	Oct 16, 11:59 pm	Chapters 7, 8.1, 8.3, 8.5
	HW Assignment 6	Oct 23, 11:59 pm	Chapter 10
	HW Assignment 7	Nov 6, 11:59 pm	Chapter 12
	HW Assignment 8	Nov 20, 11:59 pm	Chapters 13, 14
	HW Assignment 9	Dec 4, 11:59 pm	Chapters 15, 16.3
	HW Assignment 10	Dec 11, 11:59 pm	Chapter 17

- homework assignments are due at 11:59 pm on Wednesday; late submissions are accepted up until 11:59 pm on Sunday (that is, four days later) with a 50% penalty on those questions answered after the Wednesday deadline; there are no exceptions or extensions to these deadlines for any reason

<b>Exam Schedule</b>	Exam 1	Thrs Oct 3, 6:30 – 8:30 pm, W10 PBB (A – M), W307 PBB (N – Z)	Chapters 1 – 6, 8.3 – 8.5
	Exam 2	Thrs Nov 7, 6:30 – 8:30 pm, W10 PBB (A – M), W307 PBB (N – Z)	Chapters 7, 8.1 – 8.2, 10, 12
	Exam 3	Dec 16 – 20, Date/Time/Location TBA	Chapters 13 – 15, 17 – 19

- students who have a conflict with either of the first two exams must make arrangements for a makeup with Dr. Ankenmann the week before the exam; makeup exams will occur earlier on the day of the exam, or the next day
- students with accommodations must make alternative arrangements with Dr. Ankenmann the week before the exam; exam accommodations will occur earlier on the day of the exam, or the next day
- the Final Exam Schedule is set by the Registrar's Office during the first five weeks of the semester; the date/time/location of Exam 3 will be announced after it has been set by the Registrar's Office
- the Registrar's Office defines/recognizes the following two kinds of exam conflicts: (1) two or more final exams scheduled during the same exam period, (2) more than two final exams scheduled on the same day; these are the only kinds of exam conflicts allowed by Dr. Ankenmann

- please note that travel arrangements, including airline flights, do not qualify as exam conflicts; therefore, students should not book any travel during Exam Week (Dec 16 – 20) until after you know the date and time of Exam 3
- students who have a qualifying exam conflict (as defined above) may request a makeup final examination from the instructor; they must register their intent to take advantage of the makeup exam opportunity with their instructor by October 1; the makeup exam period is Friday, Dec 20 from 5:30 – 7:30 pm
- students with accommodations must make alternative arrangements with Professor Ankenmann the week before the exam; exam accommodations will occur on the day of the exam, or the next day

### **Recommended Textbook Exercises**

Students are expected to know how to answer all of these exercises, even though they aren't scored/graded. Some of these questions are included in (or similar to) the homework assignments, and some are used as examples in lectures and/or discussion sections.

**Chapter 1:** 1, 7, 9, 21, 23, 25, 31, 33, 35, 37, 39

**Chapter 2:** 1, 3, 5, 13, 15, 17, 21, 23, 35, 39, 43, 45, 47, 53, 59, 61, 63, 65, 67, 71, 73, 79, 81

**Chapter 3:** 1, 3, 5, 9, 11, 15, 19, 23, 27, 29, 31, 35, 37, 41, 43

**Chapter 4:** 1, 3, 5, 7, 13, 15, 17, 19, 21, 23, 25, 27, 29, 31, 33

**Chapter 5:** 1, 3, 5, 7, 9, 11, 13, 15, 17, 19, 21, 23, 25, 27, 29, 31, 33, 35, 37, 39, 41, 43, 45, 47, 49, 51, 53, 55, 57

**Review (pages 163 – 172):** 3, 5, 7, 15, 17, 19, 23, 25, 31, 37

**Chapter 6:** 3, 5, 7, 11, 13, 15, 19, 25, 27, 29, 31, 33, 35, 37, 39, 45

**Chapter 7:** 1, 3, 5, 7, 11, 13, 15, 17, 19, 21, 23, 25, 27, 29, 29, 33, 35, 39, 41, 43, 45, 47, 49, 51, 53, 55, 57, 67, 69, 75

**Review (pages 323 – 334):** 1, 3, 7, 9, 11, 15, 17, 21, 29, 31, 33, 43

**Chapter 10:** 5, 7, 9, 11, 13, 17, 19, 21, 23, 25, 27, 29, 31, 33, 35, 37, 39, 41, 43, 45

**Review (pages 385 – 390):** 1, 3, 5, 7, 9, 11, 13, 15, 17, 21, 23, 25, 27, 35, 39

**Chapter 12:** 3, 5, 7, 9, 10, 11, 12, 14, 23, 27, 31, 33, 35, 37, 39, 41, 43, 51, 53, 63

**Chapter 13:** 1, 5, 7, 9, 11, 13, 15, 17, 19, 21, 23, 25, 27, 31, 33, 35, 37, 39, 41, 43, 45, 47, 49, 51, 53

**Chapter 14:** 5, 9, 13, 15, 17, 19, 21, 23, 25, 27, 29, 31, 33, 35, 37

**Chapter 15:** 1, 3, 5 (only b and c), 7, 9, 15, 17, 19, 25, 27, 29, 31, 33, 35, 37, 39, 41, 43

**Chapter 17:** 1, 3, 9, 11, 13, 15, 23, 25, 27, 29, 31, 33, 37, 39, 49, 51, 53, 57, 59, 61, 63, 75, 77, 83

**Chapter 18:** 1, 9, 13, 23 (only a and b), 25, 27 (only a and b), 29, 31, 33, 39

**Chapter 19:** 1, 3, 5, 13, 17, 19, 23, 25, 27, 39, 41, 47, 49

**Review (pages 724 – 733):** 5, 11, 17, 19, 21, 31, 33, 35, 37, 47

## ICON Direct Information

- This class will be taught with electronic content. The course material is available in the ICON course site. Students may opt out of this content, but the consequences of doing so may affect their outcomes in this course.
- Students will lose access to any additional content the instructor might add to the eTextbook, such as links to other content; additional supplemental resources; and highlights, annotations, and any study tips the instructor may add to guide your engagement and learning in the course. ***Please consider that if you choose to opt out, you may not be able to earn course points or assignment grades associated with this content.***
- Students risk falling behind in the course if they have not acquired alternate versions of the same materials prior to the first day of the class.
- Faculty are not responsible for providing students with alternative materials or waiving course/class requirements.

## College of Liberal Arts and Sciences (CLAS) Course Policies

### Attendance and Absences

- lecture and discussion section attendance are not recorded, and do not count directly toward the final grade; however, it is expected that students attend all lectures and discussion sections in order to be adequately prepared for the exams
- this is a 3-semester-hour course; therefore, students are expected to spend (on average) 6 additional hours of outside work per week (not including discussion sections or exams), for a total of 10 hours per week if lecture and discussion section times are included
- of course, you need to keep in mind that the '6 additional hours of outside work per week' is an average taken over the weeks in the semester and over a diverse collection of students and courses; thus, effort amounts will vary from week to week and from student to student; however, it's fair to say that the more effort you put in, the more you will get out of the course

University regulations require that students be allowed to make up examinations that have been missed due to illness, religious holy days, military service obligations (including service-related medical appointments), or other unavoidable circumstances or University-sponsored activities. Students with UI-authorized activities must discuss their absences with the instructor as soon as possible. Religious obligations must be communicated within the first three weeks of classes.

### Exam Policies

#### **Communication: UI Email**

Students are responsible for all official correspondences sent to their UI email address (uiowa.edu) and must use this address for any communication with instructors or staff in the UI community. For the privacy and the protection of student records, UI faculty and staff can only correspond with UI email addresses.

#### **Where to Academic Support for this Course**

Information about tutoring will be available here starting the second week of class:

<https://stat.uiowa.edu/resources/tutoring>. Tutoring is also available from the **Tutor Iowa** academic support site: <https://tutor.uiowa.edu/>.

## **Mental Health Resources and Student Support**

Students are encouraged to be mindful of their mental health and seek help as a preventive measure or if feeling overwhelmed and/or struggling to meet course expectations. Students are encouraged to talk to their instructor for assistance with specific class-related concerns. For additional support and counseling, students are encouraged to contact **University Counseling Service (UCS)**. Information about UCS, including resources and how to schedule an appointment, can be found at [counseling.uiowa.edu](https://counseling.uiowa.edu). Find out more about UI mental health services at [mentalhealth.uiowa.edu](https://mentalhealth.uiowa.edu).

[Student Care and Assistance](#) provides assistance to University of Iowa students who are experiencing a variety of crisis and emergency situations, including but not limited to medical issues, family emergencies, unexpected challenges, and sourcing basic needs such as food and shelter. More information on the resources related to basic needs can be found at [basicneeds.uiowa.edu/resources/](https://basicneeds.uiowa.edu/resources/). Students are encouraged to contact Student Care & Assistance in the Office of the Dean of Students (Room 135 IMU, [dos-assistance@uiowa.edu](mailto:dos-assistance@uiowa.edu), or 319-335-1162) for support and assistance with resources.

## **University Policies**

### **Accommodations for Students with Disabilities**

The University is committed to providing an educational experience that is accessible to all. If a student has a diagnosed disability or other disabling condition that may impact the student's ability to complete the course requirements as stated in the syllabus, the student may seek accommodations through [Student Disability Services](#) (SDS). SDS is responsible for making Letters of Accommodation (LOA) available. **The student must provide an LOA to the instructor as early in the semester as possible, but requests not made at least two weeks prior to the scheduled activity for which an accommodation is sought may not be accommodated.** The LOA will specify what reasonable course accommodations the student is eligible for and those the instructor should provide. Additional information can be found on the [SDS website](#).

### **Free Speech and Expression**

### **Absences for Religious Holy Days**

### **Classroom Expectations**

### **Non-discrimination**

### **Sexual Harassment/Misconduct and Supportive Measures**

### **Sharing of Class Recordings**

## Lecture Schedule

<u>DAY</u>	<u>DATE</u>	<u>TEXTBOOK</u>	<u>TOPIC</u>
<b>PART 1 – EXPLORING DATA &amp; RELATIONSHIPS BETWEEN VARIABLES (CHAPTERS 1 – 6, 8.3 – 8.5)</b>			
1	Aug. 26	M 1.1 – 1.4	Introduction to Statistics; Data; Variables; Models
2	28	W 2.1	Summarizing and Displaying a Categorical Variable
3	30	F 2.2	Displaying a Quantitative Variable
*	Sept. 2	M Labor Day	No Class
4	4	W 2.3 – 2.4	Shape; Center (Mean, Mode, Median)
5	6	F 2.5	Spread (Range, Interquartile Range, Standard Deviation)
6	9	M 2.5	Spread; Relationships Among Shape, Center, Spread
7	11	W 3.1 – 3.2	Contingency Tables; Conditional Distributions
8	13	F 3.2 – 3.4	Independence/Association; Displaying Contingency Tables
9	16	M 4.1 – 4.2	Displays for Comparing Groups; Boxplots; Outliers
10	18	W 5.1 – 5.2	Using the SD to Standardize Values; Shifting and Scaling
11	20	F 5.1 – 5.2	Normal Models
12	23	M 5.3	Normal Percentiles; Normal Probability Plots
13	25	W 5.4 – 5.5	Scatterplots; Correlation
14	27	F 6.1 – 6.2	Correlation $\neq$ Causation; Outliers; Ecological Correlation
15	30	M 6.2 – 6.3, 8.3 – 8.5	Least Squares Line of Best Fit; The Linear Model
<b>PART 2 – LINEAR REGRESSION, GATHERING DATA, &amp; PROBABILITY (CHAPTERS 7, 8.1 – 8.2, 10, 12)</b>			
16	Oct. 2	W 7.1 – 7.3	The Linear Model; Finding the Least Squares Line
<b>EXAM 1</b>	<b>3</b>	<b>TH</b> <b>(Chpt 1 – 6, 8.3 – 8.5), W10 PBB (A – M), W307 PBB (N – Z), 6:30 – 8:30 pm</b>	
17	4	F 7.3 – 7.4	Finding the Least Squares Line; Regression to the Mean
18	7	M 7.5, 8.1	Residuals; The Residual SD; Examining Residuals
19	9	W 7.6 – 7.7, 8.2	R-Squared; Assumptions and Conditions; Extrapolation
20	11	F 10.1 – 10.3	Sampling; Populations and Parameters; SRS
21	14	M 10.4 – 10.7	Other Designs; Generalization; The Valid Survey; Mistakes
22	16	W 12.1 – 12.2	Random Phenomena; Law of Large Numbers; Theoretical Prob
23	18	F 12.3 (397 – 403)	Complement Rule; Simple Addition Rule
24	21	M 12.3 (403 – 407)	Gen Addition Rule; Venn Diagrams; Simple Multipl'tn Rule
25	23	W 12.4	Conditional Probabilities; General Multiplication Rule
26	25	F 12.5	Independence
27	28	M 12.6	Picturing Probability: Tables, Venn Diagrams, Tree Diagrams
<b>PART 3 – CONFIDENCE INTERVALS &amp; INFERENCE (CHAPTERS 13 – 15, 17 – 19)</b>			
28	30	W 13.1 – 13.2	Sampling Dist'n of the Proportion; Assumptions and Conditions
29	Nov. 1	F 13.3	Confidence Interval for a Proportion
30	4	M 13.4 – 13.5	Interpretation of a CI; Margin of Error; Uncertainty vs Precision
31	6	W 13.6 & 14.1	Choosing the Sample Size; Sampling Dist'n of the Mean
<b>EXAM 2</b>	<b>7</b>	<b>TH</b> <b>(Chpt 7, 8.1 – 8.2, 10, 12), W10 PBB (A – M), W307 PBB (N – Z), 6:30 – 8:30 pm</b>	
32	8	F 13.6 & 14.1	Sampling Dist'n of the Mean; Central Limit Theorem
33	11	M 14.2, 14.3, 14.5	Confidence Interval for a Mean; Interpreting CIs
34	13	W 15.1 – 15.3	Hypotheses; P-Values; The Logic of Hypothesis Testing
35	15	F 15.1 – 15.3	z-Test for a Population Proportion
36	18	M 15.4 – 15.5, 16.3	t-Test for a population Mean
37	20	W 15.4 – 15.5, 16.3	Interpreting P-Values; CIs and Hypothesis Tests
38	22	F 17.1 – 17.3	Confidence Interval and z-Test for Diff btwn Two Proportions
*	FALL BREAK (Nov. 25 – 29)		No Classes
39	Dec. 2	M 17.4 – 17.5	Confidence Interval and t-Test for Diff btwn Two Means
40	4	W 18.1 – 18.2	Paired Data
41	6	F 18.1 – 18.2	The Paired t-Test
42	9	M 18.3	Confidence Intervals for Matched Pairs
43	11	W 19.1	Chi-Square Goodness-of-Fit Test
44	13	F 19.4	Chi-Square Test of Independence
<b>EXAM 3</b>	<b>Dec. 16 – 20</b>	<b>(Chpt 13 – 15, 17 – 19), Date/Time/Location TBA</b>	