

**Statistics**  
**STAT 220, Spring 2020**  
**\*\* UPDATED \*\***

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<b>Office Hours:</b>	<b>** Held on Google Meet **</b> Monday 1:00-3:00 PM, Wednesday 12:00-2:00 PM, Friday 1:00-3:00 PM, and by appointment
<b>Class Hours:</b>	<b>**Lectures have been recorded and posted on Moodle **</b> <i>Section 1:</i> Tuesday and Thursday 9:30AM-10:45AM <i>Section 2:</i> Tuesday and Thursday 11:00AM-12:15PM
<b>Room:</b>	<b>N/A</b>
<b>Textbook:</b>	<i>Introduction to Statistics and Data Analysis</i> by Peck, Short, and Olsen
<b>Course Website:</b>	Moodle and Canvas
<b>Prerequisites:</b>	Math 135 (Calculus 1)

Welcome to STAT 220: Statistics! This is a one semester course which will introduce you to probability and statistical inference. At the end of this course, you will be able to:

- 1) Understand the basics of how data should be gathered, summarized, and analyzed to draw statistical conclusions, especially as applied to solving real-world problems
- 2) Describe data sets using both graphical tools and numbers, such as mean and standard deviation
- 3) Understand the variation inherent to a sample from a population
- 4) Follow numerical arguments and make inferences about a variable in question (hypothesis tests and confidence intervals)
- 5) Identify, understand, and interpret the statistical methods being used in journal articles

The course calendar that follows will briefly describe each of the topics that we will cover. Going forward, lectures will be recorded and posted online, so the list of topics gives you a rough idea of when you should be learning each topic. The class will, for the most part, follow the textbook, *Introduction to Statistics and Data Analysis* by Peck, Olsen, and Devore. Reading the designated sections of the textbook prior to watching the videos is highly recommended. The grade you earn will be a reflection of how well you have mastered the material in this course and will be based upon the following five criteria:

**1) Participation (5%):** Throughout the semester, there will be a number of problems that we'll work on together as a class. Volunteering your thoughts and solutions (even if partial) to these problems is an essential part of your learning. Participation also takes the form of asking questions during class (or

office hours) and evaluating your homework partner each week (see #2). As we move towards online learning, participation can take the form of attending and asking questions during virtual office hours.

**2) Homework (15%):** Weekly homework assignments will be given. I truly believe that the only way to learn statistics (and mathematics, in general) is to *do* statistics. A majority of the problems will be drawn from the book, although I may incorporate some of my own questions. You are permitted (and encouraged!) to work with your classmates on these assignments. To help foster this collaboration, homework assignments will be submitted in groups, with group membership randomly assigned each week. To prevent one person from doing all the work each of you will have an opportunity to evaluate your partner's *effort*. To receive full credit, solutions to homework assignments should be clearly written on the provided worksheet and have all relevant work organized in the proper sequence. Homework assignments will be due on either Tuesday or Thursdays by 4PM, depending on the week. To submit your assignment, upload a pdf copy of your work to Canvas. Late homework assignments will not receive full credit and homework more than one day late will receive no credit.

**3) Quizzes (15%):** A brief quiz will be given each week, accessed on Canvas. The quiz questions will be drawn from the material covered in the homework assignment of the same number (e.g. Quiz #5 will be based solely on the material found on Homework #5) and the questions themselves will resemble those seen on homework assignments. In other words, quizzes are not cumulative. They are, however, timed, so you will have 25 minutes to access the quiz, complete it, and upload your solution. Because you have flexibility in when you choose to take the quiz, there will be **NO MAKEUPS ALLOWED** if you fail to submit the quiz before the deadline.

**4) Two In-Class Exams (40%):** There will be two in-class tests. The exams will not be exercises in memorization, but will try to be written so that students with a solid understanding of the concepts should have little, if any, trouble. The first exam is tentatively set for **Thursday February 20<sup>th</sup>**, the second for **Tuesday April 21<sup>st</sup>**.

**5) Final Exam (25%):** The final exam will be the only synchronous class that we hold for the rest of the semester. In other words, this is the only time that you have to attend class on a specific day and time. The 11:00 AM section of the course will have their final exam on Friday May 8<sup>th</sup> at 8:00AM EST. The 9:30 AM section of the course will have their exam on Tuesday May 12<sup>th</sup> at 3:00 PM EST. In general, there are no make-ups or other alterations to the timing of the final exam allowed. However, if you have a conflict with the timing of your exam, say because of differences in time zones, then you may be able to take the exam with the other section of the course. Please contact me with any issues or concerns.

Should you ever need help with this course, there are three great options available to you:

- 1) Ask a classmate for help
- 2) Attend virtual office during office hours and ask a question.
- 3) Meet with our TA (virtually) for one-on-one help. Times and location TBA.

## **Additional Course Policies:**

**Academic Integrity:** A student found cheating on an examination or assisting others in the course of an examination will receive an F for the course and will be subject to further sanctions. Copying another student's assignment is considered cheating and will result in receiving a 0 for that assignment. As previously stated, you are encouraged to work together on homework assignments. However, each student is expected to write out their own solutions. For more information, please see the College's Academic Honesty Policy, which can be found at <https://catalog.holycross.edu/requirements-policies/academic-policies/#academicintegritytext>. Additionally, the Mathematics and Computer Science department has its own Academic Integrity policy that I will pass out for all of you to read and sign.

**Information for Students with Disabilities:** The College of the Holy Cross is committed to providing all students with equal access to learning. Any student who feels the need for accommodation based on the impact of a disability should contact the Office of Accessibility Services to discuss support services available. Once the office receives documentation supporting the request for accommodation, the student would meet privately with Accessibility Services to discuss reasonable and appropriate accommodations. Then, with your permission, each instructor will receive a letter (delivered by you) outlining the reasonable accommodations they are required to make. Once I have received this letter, you and I should meet to coordinate the way these will be implemented in this course. The Office of Accessibility Services can be reached by calling 508-793-3693 or by visiting Hogan Campus Center, room 505. For more information, go to <https://www.holycross.edu/health-wellness-and-access/office-accessibility-services>

**Respect for Diversity:** It is my intent that students from all diverse backgrounds and perspectives be well-served by this course, that students' learning needs be addressed both in and out of class, and that the diversity that the students bring to this class be viewed as a resource, strength and benefit. It is my intent to present materials and activities that are respectful of diversity: gender identity, sexuality, disability, age, socioeconomic status, ethnicity, race, nationality, religion, and culture. Your suggestions are encouraged and appreciated. Please let me know ways to improve the effectiveness of the course for you personally, or for other students or student groups. In particular, if a situation causes you discomfort or offense, please feel free to:

- i) Discuss the situation privately with me. I am always open to listening to students' experiences, and want to work with students to find acceptable ways to process and address the issue.
- ii) Discuss the situation with the class. Chances are there is at least one other student in the class who had a similar response to the material.
- iii) Notify me of the issue through another source such as your academic advisor, a trusted faculty member, or a peer. If for any reason you do not feel comfortable discussing the issue directly with me, I encourage you to seek out another, more comfortable avenue to address the issue.

**Cell Phones:** Texting and/or playing games during class will hinder your ability to learn. As a deterrent, the first offense will be a warning, the second will result in dismissal from class for the day, and the third will result in a much longer suspension from class. In short, turn your cell phones off during class.

**Calculators:** A calculator is highly recommended but not required. You do not need to go out and buy a graphing calculator - a basic calculator will be sufficient for our course. In fact, graphing calculators will not be allowed on quizzes or exams. Using your cell phone as a calculator is not permitted since phones are meant as communication devices (See Academic Integrity and Cell Phone policies above).

**Grading:** Final grades will be given according to the following percentage cutoffs. These cutoffs, although fairly strict, can be lowered (according to class performance), but not raised, no matter how well the class performs

Final Grade	Percentage
A	93 to 100
A-	90 to <93
B+	87 to <90
B	83 to <87
B-	80 to <83
C+	77 to <80
C	73 to <77
C-	70 to < 73
D+	67 to <70
D	63 to <67
F	0 to <63

**Course Calendar (subject to change)**

Date	Section	Topic	Notes
Jan 21 – T	1.1-2.1 2.2,2.5	Syllabus; Types of Data Sampling Strategies	
Jan 23 – R	2.2,2.5 2.3-2.4	Sampling Strategies, cont. Experimental Design	Course Survey
Jan 28 – T	1.4 3.1-3.3, 3.5	Visualizing Data: Bar Charts, Pie Charts, Histograms, Dotplots, Stem and Leaf Plots, etc.	
Jan 30 – R	3.4 4.1,4.2	Visualizing Data – Modern Examples Measures of Center	HMWK #1 Due
Feb 4 – T	4.2,4.4	Measures of Variation (St. Dev, Chebyshev’s Theorem) Percentiles	Quiz #1
Feb 6 – R	4.3,4.5 6.1-6.2	Quartiles, Five Number Summary, Boxplots, IQR Rule Sample Spaces and Events, Review of Set Theory	HMWK #2 Due
Feb 11 – T	6.3, 6.6	Review of Set Theory, cont. Probability Properties; Addition Rule	Quiz #2
Feb 13 – R	6.5 6.4 6.6	Independence of Events; Multiplication Rule Conditional Probability The Law of Total Probability	HMWK #3 Due
Feb 18 – T	6.6, N/A 7.1	Bayes’ Rule, Relative Risk and Odds Ratios Random Variables	
Feb 20 – R	7.2, 7.4	Discrete Probability Distributions Mean and Variance of a RV	
Feb 25 – T	<b>1.1-6.6</b>	<b>Exam #1 – Chapters 1-6</b>	
Feb 27 – R	7.5 N/A	Binomial Distribution Counting Techniques	HMWK #4 Due (Friday)
<b>Feb 29 – Mar 8</b>		<b>Spring Break – No Class!</b>	
Mar 10 – T	7.5	Counting Techniques and Binomial Dist., cont. Geometric Distribution	Quiz #4
Mar 12 – R	N/A 7.3	Poisson Distribution Probability Distributions for Continuous RVs (General)	
Mar 17 – T		<b>No Class – Coronavirus, Tech Week</b>	
Mar 19 – R		<b>No Class – Tech Week</b>	HMWK #5 Due
Mar 24 – T	7.3, 7.6	The Uniform and Normal Distributions	
Mar 26 – R	7.8 N/A	Normal Approximation to the Binomial Linear Combinations of Normal RVs	Quiz #5
Mar 31 – T	8.1-8.3 8.2	Sampling Distributions The Central Limit Theorem	HMWK #6 Due
Apr 2 – R	9.1	Point and Interval Estimation [General]	Quiz #6
Apr 7 – T	9.2	Estimating a Population Proportion	HMWK #7 Due
<b>Apr 9-13</b>		<b>Easter Break – No Class!</b>	
Apr 14 – T	9.3,9.4	Estimating a Population Mean	Quiz #7
Apr 16 – R	10.1-10.2 10.3	Introduction to Hypothesis Testing Testing a Claim: Proportions	HMWK #8 Due
Apr 21 – T	<b>7.1-9.3</b>	<b>Exam #2 – Chapters 7-9</b>	
Apr 23 – R	10.4,10.5	Testing a Claim: Means	
Apr 28 – T	11.1	Testing a Claim: Two Means	HMWK #9 Due
Apr 30 – R	11.3 11.2	Testing a Claim: Two Proportions Matched Pairs Analysis	Quiz #9 <b>Last Day of Class</b>
May 8 – F		<b>FINAL EXAM – 11:00AM Section</b>	
May 12 – T		<b>FINAL EXAM – 9:30AM Section</b>	