

Instructor:

Dr. Chris Lee
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Office Hours:

All office hours are by appointment.
 To make an appointment, please use
 the link:

<https://drchrislee.youcanbook.me>

Mon	Tue	Wed	Thu	Fri
Math 121 10:50 – 11:50am		Math 121 10:50 – 11:50am		Math 121 10:50 – 11:50am
INQ 240 1:10 – 2:10pm	Math 331 1:10 – 2:40pm	INQ 240 1:10 – 2:10pm	Math 331 1:10 – 2:40pm	INQ 240 1:10 – 2:10pm
Office Hours 2:15 – 3:45pm	Office Hours 2:45 – 4:15pm	Office Hours 2:15 – 3:45pm	Office Hours 2:45 – 4:15pm	
Curriculum Committee 4 – 5pm				

Overarching Philosophy: Your ability to do Mathematics is not measured by a number stamped on your forehead at birth. Ability is a direct result of effort, and everything in this course is designed to encourage and reward maximum effort. No matter what your ability or grade is at any given moment, it can be changed through focused effort.

Course Description: Does gun control save lives? Such a politically charged question can be approached from many directions. In this course students will learn the methodologies of modern statistics and use them to address the issue of measuring the effectiveness of gun control. Special attention will be given to the importance of being able to set aside politics, emotions, and pre-conceived notions in order to analyze a difficult question from a statistical point of view.

Learning Outcomes:

1. Students will be able to use the methodologies of statistics to
 - a. Investigate a topic of interest and make decisions based on the results.
 - b. Design and carry out a simple statistical experiment.
 - c. Critique news stories and journal articles that include statistical information. In the critique students will recognize variability and its consequences, identify potential sources of bias and both proper and improper cause and effect inference.
2. Students will be able to articulate the importance and limitations of using data and statistical methods in decision making.
3. Students will be able to write about course topics clearly and effectively.
4. Students will be able to interpret quantitative information related to the course topic.

Required Text: *Statistics in Practice*. Moore, Notz, & Fligner

Attendance: Attendance is critical to the understanding of the material in the course; it is both required and expected. Any absence that is not discussed with the instructor prior to the missed class is considered unexcused. If you accumulate 3 unexcused absences you will be dropped from the class with a grade of DF recorded. When absent, you are responsible for all material covered in class. Missing class has no effect on assignment due dates.

Cell Phones: This is very simple - no cells phones are allowed to be used or even visible in our classroom. This includes before, during, and after class. If a cell phone is seen, the student may be asked to leave the classroom and the day will be counted as an unexcused absence.

Homework: Homework problems will be assigned almost every class period and are due at the start of the next class. Each homework assignment is graded on a 15-point scale as follows:

- 5 pts – one specific problem for correctness, clarity, and thoroughness.
- 5 pts – approximately 7-10 problems graded for effort and completeness
- 5 pts – organization. The graded for correctness problem MUST be on top, all pages stapled, neat, & READABLE.

Writing: While knowing statistics is important, it is useless if you cannot communicate the ideas and concepts you have learned. Work for this course includes three writing assignments and a project.

Late Work: Unless specific permission is given in advance of the due date, no late work will be accepted.

Grading: Components of a student’s grade will be weighted as follows:

Tests: 80% Short Writing: 5% Project: 10% Homework: 5%

A scale will for final grades will be not be lower than the scale given below.

0	60	63	67	70	73	77	80	83	87	90	93
F	D-	D	D+	C-	C	C+	B-	B	B+	A-	A

Academic Integrity: Students are expected to follow the integrity policy detailed in the handbook *Academic Integrity at Roanoke College*. Additionally, if you are ever uncertain as to how the College’s policy pertains to any assignment or exam in this course, please ask me for clarification. The bottom line is that all work that a student submits for a grade must be **solely** the work of that student unless the instructor has given explicit permission for students to work together. You will have the opportunity on some quizzes and our main project to collaborate with another as you work in pairs. It is critical that you understand that collaboration means both parties are contributing equally and meaningfully to the assignment. Adding your name to the work of another, as well as using a divide-and-conquer approach, are both examples of seeking credit for work that is not your own.

MCSP Conversations: The MCSP Department offers a series of discussions that appeal to a broad range of interests related to these fields of study. These are known as the talks and lectures in the MCSP Conversation Series. You are invited to be involved with all of these meetings; however, participation **at least one** of these sessions is mandatory. After attending, submit a one-page paper reflecting on the discussion. This should **not** be a regurgitation of the content, but rather a personal contemplation of the experience. These reaction papers will be submitted through Inquire; your final grade will be reduced by 2% if this is not completed

Testing: We will be making use of **mastery-based testing** rather than a points-based system. Mastery-based testing is very different from what you are used to – do not hesitate to ask me questions.

Description: You only receive credit for answers that demonstrate you completely understand (have mastered) a topic. But, you get many chances to display mastery throughout the semester with no penalty whatsoever for earlier attempts.

- The course has been boiled down to 16 essential types of questions, or “topics”.
- Your mastery of questions on these topics is assessed through the working of problem each Friday and during the scheduled final exam period.
- Each problem submitted is graded as either “Mastery” or “Not Mastered”. A grade of Mastery indicates that you have demonstrated full understanding of the concept being tested and further work on the topic is not necessary.
- Once you have mastered a problem you need not ever attempt it again.
- There is no penalty whatsoever for multiple attempts taken to achieve mastery.
- Mastery does not mean perfect, it means you understand and can demonstrate all fundamentals of the topic and are proficient at the level desired for the course – you do not need to study the topic further.

Your overall test grade is then determined by the number of topics you have mastered.

#Mastered	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
Exam Grade	100	95	90	85	80	75	70	65	60	55	50	45	40	35	30	25

Notes on Master-Based Testing (in no specific order)

- Clear content objectives, students continually know exactly what they need to work on to improve.
- Credit only for eventual mastery. No partial credit. Multiple attempts with complete forgiveness.
- A points-based system sets arbitrary deadlines by which time perfection must be attained.
- Perseverance: Points – try a problem once, maybe twice, hope for the best.
Mastery – Keep trying until you succeed (and I know you can)
- Use of feedback: Points – do I agree with the instructors grading
Mastery – what can I do to demonstrate that I understand the concept (improvement!)
- Reduced Test Anxiety: Points – every test has the potential to damage your GPA.
Mastery – no one test can harm your grade.
- Intelligent Test Preparation: You may choose to skip problems on a test. Better to achieve mastery on some than to demonstrate mediocrity on all.
- No longer will any of us have to wonder just what exactly a 7/10 means on a problem compared to an 8/10...
- A “broad and superficial” strategy may earn a C or D in a points-based system, in mastery you will fail.

Course Schedule This course expects you to spend at least 12 hours of work each week inside and outside of class.

Wed	Aug 29	Intro	Writing #1 Assigned
Fri		Topic 1 – Chap 1 – Picturing Distributions with Graphs	Writing #1 Due
Mon	Sept 3	Topic 2 – Chap 2 – Describing Distributions with Numbers	
Wed		Topic 2 – Chap 2 – Describing Distributions with Numbers	
Fri		Topic 3 – Chap 3 – The Normal Distribution	
Mon	Sept 10	Topic 3 – Chap 3 – The Normal Distribution	
Wed		Topic 4 – Chap 4 – Scatterplots and Correlation	
Fri		Mastery Day	
Mon	Sept 17	Topic 4 – Chap 4 – Scatterplots and Correlation	
Wed		Topic 5 – Chap 5 – Regression	
Fri		Topic 6 – Chap 6 – Two-way Tables	
Mon	Sept 24	Topic 7 – Chaps 9,10 – Producing Data	
Wed		Topic 7 – Chaps 9,10 – Producing Data	Writing #2 Assigned
Fri		Mastery Day	
Mon	Oct 1	Topic 8 – Chap 11 – Introduction to Probability	
Wed		Topic 9 – Chap 12 – General Rules of Probability	
Fri		Topic 9 – Chap 12 – General Rules of Probability	
Mon	Oct 8	Topic 10 – Chap 15 – Sampling Distributions for a proportion	
Wed		Topic 10 – Chap 15 – Sampling Distributions for a proportion	Writing #2 Due
Fri		Mastery Day	
Fall Break			
Mon	Oct 22	Topic 11 – Chap 16 – Confidence Intervals	
Wed		Topic 11 – Chap 16 – Confidence Intervals	Project Assignment
Fri		Topic 12 – Chap 17 – Tests of Significance	
Mon	Oct 29	Topic 12 – Chap 17 – Tests of Significance	
Wed		Group work on Project	
Fri		Mastery Day	
Mon	Nov 5	Topic 13 – Chap 19 – Sampling Distribution for a Mean	
Wed		Topic 13 – Chap 19 – Sampling Distribution for a Mean	
Fri		Topic 13 – Chap 19 – Sampling Distribution for a Mean	
Mon	Nov 12	Topic 14 – Chap 20 – Inference about a Population Mean	
Wed		Topic 14 – Chap 20 – Inference about a Population Mean	
Fri		Mastery Day	
Mon	Nov 19	Project Presentations	Project Due
Mon	Nov 26	Topic 15 – Chap 24 – The Chi-Square Test	
Wed		Topic 15 – Chap 24 – The Chi-Square Test	Writing #3 Assigned

Fri		Topic 16 – Chap 26 – One-Way Analysis of Variance	
Mon	Dec 3	Topic 16 – Chap 26 – One-Way Analysis of Variance	
Wed		Mastery Day	
Fri		Course Wrap Up	Writing #3 Due
Wed	Dec 12	Mastery Day (Final Exam Block, 2-5pm)	