Instructor:
Dr. Chris Lee Trexler 270D
375-2347 clee@roanoke.edu

Office Hours:
Tue/Thu: 1:00 – 3:00pm
Wed: 2:30-3:30pm
Any other time by appointment

Course Description:
As we surf the web, are we really exercising free will? Whether it be reading, shopping, or interacting socially, we'd like to think that we are in control of our choices. The reality is that web designers and marketers use conclusions drawn from vast amounts of data to carefully craft and control our web experiences and actions. This course provides an inquiry-focused introduction to the statistical methodologies necessary to successfully explore and answer this question. Along the way students will develop an understanding of how data is collected and used in relation to virtually everything we do on the internet.

Statistics Objectives: Provides an inquiry-focused introduction to statistical methodologies. Students will gain an understanding of how decision making is accomplished using modern statistical techniques. Topics include descriptive statistics, graphical methods, estimation, elementary probability, statistical inferences, and analysis of variance; students will apply the techniques of data analysis to data sets and/or statistical studies.

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.

Technology: For some sections of the course students will need statistical software for calculations and graphics. Excel and Minitab are provided on college lab computers. Students will also need a scientific calculator.

Required Texts and Readings:
- *Statistics in Practice.* Moore, Notz, & Fligner
- *Hooked: How to Build Habit Forming Products,* Nir Eyal.
- *A Writer's Reference (6th Ed).* Hacker, Diana.

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. I will assume that if you accumulate 3 unexcused absences you are not interested in completing the course and will drop you from the class with a grade of DF (dropped-failing) recorded, regardless of your current average in the course. You, your advisor, and the registrar will receive a warning email at your second unexcused absence. When absent, excused or unexcused, you are responsible for all material covered in class. Work missed due to either an unexcused or excused absence can only be made up when arrangements are made in advance of the absence.

Homework: Homework problems will be assigned and collected almost every class period and are due at the start of the next class period. Each HW assignment is graded satisfactory/unsatisfactory. Your HW average is calculated at the end of the term by the percentage of assignments that are satisfactory. The following criterion must be met on an individual assignment for it to be considered satisfactory:
- Each and every problem must be attempted.

- Work must be shown on each problem – no simple T/F and A,B,C,D answers. Explain your work!
- At least two-thirds of the problems must be worked to completion.

Quizzes / Tests: You will not be able to procrastinate in this course. There will be 6 tests and at least 6 quizzes. Each week there will be either a quiz or test. We will not spend time reviewing for these, the review is simply to complete the homework assigned and participate in class. **NOTE**: There is a test on the Friday before break, do not miss that day!

Writing: While knowing statistics is important, it is useless if you cannot communicate the ideas and concepts you have learned, and more importantly, apply them to a topic such as whether or not we have free will on the internet. There are four writing assignments throughout the semester. These are an important and significant component of the course. These assignments will push you to address issues from a statistical standpoint and improve your writing and communication skills.

Writing Assignment 1: This is personal, reflective opinion writing. You will be asked to describe some of your daily activities on the internet and think through how you may be being manipulated, or if you are above manipulation and are truly doing whatever you'd like on the internet.

Article Analysis: For this assignment you will critique an article from an established news source. The topic of the article will be the use of statistics by online entities. You will use the knowledge you have gained thus far in the course to critique the methods used by the author.

Project: Prior to the date this project is started, you will have read the entire book *Hooked: How to Build a Habit Forming Product* by Nir Eyal. You will then propose your own product that you would like to bring to market. This may be a competitor to Facebook, a photo sharing site, a new game, or any other such similar product. Your initial product design will be well thought out. Then, you will apply statistical concepts you have learned in this course. You will design and identify the importance features of statistical studies of data you will measure about users of your products. You will describe how you will apply this quantitative information to make decisions or draw conclusions about needed changes to your product to increase success. Finally, you will discuss how you will handle uncertainty in the data you propose to measure. How will uncertainty affect your analysis and continued development of your product?

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

Final Exam: The final exam will be cumulative, equally covering all material presented in the course.

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

Tests	50%
Homework	10%
Quizzes / Short Writing	5%
Project	15%
Final Exam	20%
	100%

A grade scale will be determined after final averages are computed, but 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*

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 will be asked to leave the classroom and the day will be counted as an unexcused absence.

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 Math, Computer Science and Physics department offers a series of discussions that appeal to a broad range of interests related to these fields of study. These co-curricular sessions will engage the community to think about ongoing research, novel applications and other issues that face our discipline.

Sessions are currently being scheduled, and all will be announced in advance.

Members of this class are invited be involved with all of these meetings; however participation in **at least one** of these sessions is mandatory. After attending, students will submit within one week of the presentation a one-page+ paper reflecting on the discussion. This should *not* simply be a regurgitation of the content, but rather a personal contemplation of the experience. This write-up is counted in the Homework/Quizzes/Short Writing component of your grade.

The Writing Center @ Roanoke College, located on the Lower Level of Fintel Library, offers writing tutorials focused on written and oral communication for students working on writing assignments/projects in any field. Writers at all levels of competence may visit the Writing Center at any point in their process, from brainstorming to drafting to editing, to talk with trained peer tutors in informal, one-on-one sessions. The Writing Center is open Sunday through Thursday from 4 to 9 pm. Simply stop in, or schedule an appointment by going to www.roanoke.edu/writingcenter, where our schedule of writing workshops and creative writing playshops is also posted. Questions? Email writingcenter@roanoke.edu or call 375-4949.

Subject Tutoring is an Internationally Certified Tutoring Center through the College Reading and Learning Association (CRLA). Our highly trained staff offers individual tutoring appointments for the following subjects: Business, Economics, Mathematics, Modern Languages, Lab Sciences & Social Sciences. Subject Tutoring is located on the lower level of Fintel Library in room 05 from 4-9 p.m. Sunday – Thursday. Students can logon to make an appointment at www.roanoke.edu/tutoring in 15, 30 or 45 minute intervals. For questions or concerns, please contact Shannon McNeal at 540-375-2247 or mcneal@roanoke.edu.

The Office of Disability Support Services (DSS), is located in the Goode-Pasfield Center for Learning and Teaching in **Fintel Library**. DSS provides reasonable accommodations to students with documented disabilities. To register for Disability Support Services, students must self-identify to the Office of Disability Support Services, complete the registration process, and provide current documentation of a disability along with recommendations from the qualified specialist. Please contact JoAnn Stephens-Forrest, MSW, Coordinator of Disability Support Services, at 540-375-2247 or e-mail her at: stephens@roanoke.edu to schedule an appointment. If you have registered with DSS in the past, and would like to receive academic accommodations for this semester, please contact Ms. Stephens-Forrest at your earliest convenience, to schedule an appointment.

Course Schedule

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

Date		Chapter	Additional
Wed	Aug 31		
Fri		1 – Picturing Distributions with Graphs	Self-Reflection – writing assignment due
Mon	Sept 5	2 – Describing Distributions with Numbers	
Wed		3 – The Normal Distribution	
Fri		4 – Scatterplots and Correlation	
Mon	Sept 12	"Hooked" book discussion, chapters 1-2	
Wed		5 - Regression	
Fri		**Test 1**	
Mon	Sept 19	6 – Two-Way Tables	
Wed		8 – Producing Data: Sampling	
Fri		9 – Producing Data: Experiments	
Mon	Sept 26	11 – Introduction to Probability	
Wed		11	
Fri		**Test 2**	
Mon	Oct 3	12 – General Rules of Probability	
Wed		15 – Sampling Distribution for a Proportion	
Fri		16 – Confidence Intervals: The Basics	
Mon	Oct 10	17 – Test of Significance: The Basics	Article analysis assignment distributed
Wed		17	
Fri		**Test 3**	
Fall Break			
Mon	Oct 24	"Hooked" book discussion, chapters 3-5	
Wed		18 – Comparing Two Proportions	Article analysis due
Fri		19 – Sampling Distribution for a Mean	
Mon	Oct 31	Project Assignment / Group Work	
Wed		19	
Fri		**Test 4**	
Mon	Nov 7	20 – Inference about a Population Mean	
Wed		Project Group Work	
Fri		21 – Comparing Two Means	
Mon	Nov 14	22 – Inference in Practice	
Wed		Project Group Work	
Fri		**Test 5**	
Mon	Nov 21	Project Presentations	
Thanksgiving Break			
Mon	Nov 28	24 – The Chi-Square Test	
Wed		24	
Fri		24, 26 – One-Way Analysis of Variance	
Mon	Dec 5	26	
Wed		**Test 6**	
Fri		Projects Due / Review	
Wed	Dec 14	**Final Exam** 8:30 – 11:30 am	