



STAT 5615: Statistics in Research I

Fall 2013

Mon, Wed. 4:00 – 5:15PM. Torgersen 2150.

Catalog description: Concepts in statistical inference, including basic probability, estimation, and test of hypothesis, point and interval estimation and inferences; categorical data analysis; simple linear regression; and one-way analysis of variance.

Instructor: Dr. Anne Ryan Office: 416-B Hutcheson Hall

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Office Hours: Tuesday 11am-12pm Wednesday 1:00pm –2:00pm

- *Other times are available by appointment.*

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Required materials: An Introduction to Statistical Methods and Data Analysis (sixth edition), by Lyman Ott & Michael Longnecker (Duxbury Press, 2008), ISBN-10: 0495017582, ISBN-13: 978-0495017585. This is available at any of the University bookstores.

Prerequisites: 1 year calculus.

- *Software: The use of SAS JMP will be covered in Stat 5615. The student will have the choice of completing assignments in SAS JMP, SAS, or any other statistics software.*
- *JMP has a purchasing price of \$8+tax for Virginia Tech students. Students who purchase JMP are entitled to free upgrades of this license while enrolled at Virginia Tech. Instructions for purchasing JMP can be found at the following link:*
- <http://www2.ita.vt.edu/software/student/products/sas/jmp/index.html>.
- *A student version of SAS (no Mac version) can be purchased from the Software Distribution Center at the following link:*
- <http://www2.ita.vt.edu/software/student/products/sas/sas/index.html>.

Course web page: The University's Scholar system (scholar.vt.edu) will be used to post the course web page. This will give you access to your grades, lecture notes, problem sets, homework and test solutions, and course announcements. If you need help accessing this system, contact 4 Help at 4help@vt.edu, or see the instructor during office hours.

Grading: You will receive a letter grade of A, B, C, D, F with the plus or minus adjustments based on your performance on written homework assignments, midterm exams, and a final exam.

Homework Assignments: 20%

Test 1: 15%

Test 2:	20%
Test 3:	20%
Final Exam:	25%

Homework: Homework will be assigned, and due, on a regular basis. Your lowest homework grade will be dropped from your final grade calculation. Due dates may vary, but will be announced in class as well as posted on Scholar with the assignment. You are permitted, and encouraged, to discuss these assignments with other students, but you must write your reports (including any computer code) on your own. Copying other students' work is a violation of the Honor Code.

Tests: There will be three tests and one cumulative final exam. Test I is scheduled on Wednesday, September 18. Test II is scheduled on Wednesday, October 23. Test III is scheduled for Wednesday, November 20.

Final Exam: The cumulative final exam is scheduled *Wednesday, December 18 from 7:45am-9:45am*. The final exam is optional. Prior to the final exam your grade will be computed based on the 75% of material that has been completed thus far. If you are satisfied with this grade, you are exempt from taking the final exam and will receive your grade up to that point in the class. Otherwise, you may take the final exam to IMPROVE your final grade in the course.

Other class policies:

- *If you need course adaptation or accommodations because of disability or medical emergencies notify the instructor.*
- *Barring illness or other unforeseen emergencies, missed homework assignments and exams cannot be made up and will receive a grade of zero. The only other exceptions to this policy are if you are involved in an official University activity (e.g., out-of-town competition) or event directly related to your graduate program (e.g., conference) that cannot be scheduled at another time. **In those instances, you must notify the instructor at least three weeks prior to the date that the missed homework will be assigned or missed exam is scheduled, so that alternative arrangements can be made.***
- *Any questions about homework grades should be referred first to the teaching assistant. If you have questions about an exam grade, or cannot resolve an issue with the teaching assistant, see the instructor during office hours.*
- *The grader reserves the right to mark off for untidy or unclear submitted work. All work must be written (or typed) neatly, with each problem clearly labeled and final answers clearly indicated. Pages must be stapled, or neatly bound, in the correct order, and your name must appear on the first page. You must show all work for consideration of partial credit.*
- *The tenets of the Virginia Tech Graduate Honor Code will be strictly enforced in this course and all assignments shall be subject to the stipulations of the Graduate Honor Code.*

	<u>Topic</u>	<u>Textbook Sections</u>
I.	Introduction to Statistical Reasoning and Scientific Method	Chapter 1; 2.1, 2.2, 2.3, 2.4,
	A. Descriptive statistics	
	1. Graphical statistics	3.3, 3.6
	2. Summary statistics	3.4, 3.5
	B. Probability concepts and models	4.6
	1. Discrete random variables	4.7, 4.8, (10.5)
	2. Continuous random variables	4.9, 4.10
	3. Sampling distributions	4.11, 4.12, 4.13
	C. Statistical inference concepts and procedures	5.1; 7.1
	1. Point and interval estimation	5.2, 5.3; 7.2; 10.2
	2. Hypothesis testing	5.4, 5.5, 5.6, 5.7; 7.2; 10.2
II.	Specialized Methods	
	A. Inferences on two populations	6.1, 6.2, 6.4, 6.6; 7.3; 10.3
	B. Inference on multiple samples	
	1. One-way analysis of variance	8.1, 8.2; 7.4
	2. Multiple comparisons and contrasts	9.1, 9.2, 9.3, 9.4, 9.5, 9.6, 9.8
	C. Simple linear regression and correlation	11.1, 11.2, 11.3, 11.4, 11.5, 11.7
	D. Categorical data analysis (time permitting)	10.1, 10.4, 10.5, 10.6, 10.7
	E. Nonparametric inference (time permitting)	5.8; 6.3, 6.5; 8.6