



STAT 5615: Statistics in Research I

Fall 2009

Mon, Wed. 4:00 – 5:15PM. Litton-Reaves 1670.

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: Prof. Pang Du Office: 417A Hutcheson Hall Telephone: 231-7613

Email: pangdu@vt.edu

Office Hours: Monday 11:00 – noon; Tuesday 11:00 – noon

- *Other times are available by appointment only if none of the hours listed above can be made and your question of issue can not be addressed by the TA.*

Teaching assistant: Casey Turner

Office: 403P Hutcheson Hall

Email: cng06@vt.edu

Office Hour: Tuesday 12:00-1:00pm

Teaching assistant: Khaled Bedair

Office: 403E Hutcheson Hall

Email: khaledfb@vt.edu

Office Hour: Monday 1:10 – 2:10pm

Teaching assistant: Veronica Bubb

Office: 403K Hutcheson Hall

Email: vbubb@vt.edu

Office Hour: Monday 10-11am

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 and CMS.

- *Software: SAS is strongly recommended but not required. To purchase a student version of SAS, go to <http://www.ita.vt.edu/studentsoftware/website/products/stuproductinfo.145.html>*
- *Campus labs with SAS: Torgersen 1010 and Torgersen 1080*

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 exam solutions, course announcements, and the *class discussion forum*. 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 usual plus or minus adjustments based on your performance on (approximately) five written homework assignments, two midterm exams, and a final exam. The weighting is as follows:

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|-----------------------|-----|
| Homework Assignments: | 25% |
| Midterm Exam I: | 25% |
| Midterm Exam II: | 25% |
| Final Exam: | 25% |

Homework: Six sets of homework will be assigned with the best five counted in your final grade. Practice Sets will also be assigned but are not to be turned in for a grade. 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.

Exams: There will be two midterm exams and one cumulative final exam. All exams are in-class open-book exam. Midterm I is scheduled on Wed September 30. Midterm II is scheduled on Wed November 4. The final exam is scheduled according to the University timetable on Friday December 11 at 1:05PM-3:05PM. If you need to be excused from taking the final exam at the regularly scheduled time because you have two final exams scheduled within the same twenty-four hours, you must obtain a written Dean's excuse. You must discuss this with the instructor prior to Mon, November 30.

Other class policies:

- *If you need course adaptation or accommodations because of disability, medical emergencies, or if special arrangements are necessary in case of a building evacuation, notify the instructor. No penalties are incurred for late homework or missed examinations because of a medical condition or other reason over which the student has no control. Please notify the instructor should such a situation arise to make appropriate arrangements.*
- *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. For more information on the Graduate Honor Code refer to <http://filebox.vt.edu/studentinfo/gradhonor/>*



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Syllabus: The following topics will be covered, as time permits

| | <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 | 4.1, 4.2, (4.3, 4.4), 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 |