QTM 100: Introduction to Statistical Inference
Quantitative Theory and Methods

Fall 2014
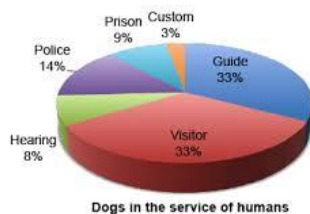Mrs. Susan Riner
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Some thoughts on statistics….

"Statistics were magic like this: they could tell you with near-certainty that a thing would occur, without a hint of when or where." Hugh Howey

"Trying to analyze a situation without enough data was like looking at a photograph of a ball in flight and trying to gauge its direction." Marcus Sakey

"There are three types of lies -- lies, damn lies, and statistics." Benjamin Disraeli

"A recent survey or North American males found 42% were overweight, 34% were critically obese and 8% ate the survey." Banksy

"99 percent of all statistics only tell 49 percent of the story." Ron DeLegge II

"All the statistics in the world can't measure the warmth of a smile." Chris Hart

 Statisticians: right 95% of the time.

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Textbook: <u>OpenIntro Statistics</u>, 2nd edition, by Diez, Barr, and Cetinkaya-Rundel
A free pdf of the textbook can be accessed online at
http://www.openontro.org/stat/textbook.php, or you can purchase a hard copy from
Amazon.com for approximately $10.

Course Format: This course consists of three weekly lectures and one lab session.

Course Description: In QTM 100 emphasis is on the utility of statistics as an everyday,
universal tool to address questions in virtually all areas of research. Students must also
enroll in a lab section. This course provides an introduction to descriptive and inferential
statistics with a variety of applications including, but not limited to, psychology,
sociology, educational studies, political science, and public health. We will introduce
probability, sampling distributions, interval estimation, hypothesis testing, and
regression.

Goals and Objectives: By the end of the course, students should be able to
(1) understand the effect of study design on interpretation of results
(2) identify appropriate statistical methods when presented with new data
(3) read and interpret basic statistical literature of various sources, from newspaper
articles to academic journals
(4) use R as a tool to perform statistical analysis

Laptop: All students are required to bring a laptop to lab. The lab will use R, a free
statistical software package. R may be downloaded here: http://cran.at.r-project.org/
A limited number of laptops will be available from the library or OCIT.

Calculator: A calculator (that is not on your phone) is required and essential for class
and tests.

Attendance: Students are expected to be on time and attend all classes and labs and are
responsible for all material covered in class and lab as well as any changes made in the
attached schedule regarding topics, homework, quizzes, and test dates. **Attendance and
consistent preparation for class will determine the success or failure the student
realizes in this course.** Missing classes, tests, assignments, etc. due to observance of
religious holidays may be negotiated in advance with the professor.

Homework: Homework problems will not be collected each class meeting but are assigned to benefit you. You will need to study 4-6 hours outside of class and lab each week.

Access and Disability Resources: Students eligible for accommodations should visit the office of Access, Disability Services and Resources (ADSR) to determine eligibility for appropriate resources. Accommodation letters should be presented to faculty at the beginning of the semester or as soon as possible. Students who are allowed extra time on tests must schedule tests with ADSR two weeks prior to the test date. Students failing to schedule their tests with ADSR may not be able to receive the extra time allotted.

Policies and Expectations:
- Please silence and put away electronic devices at the beginning of class.
- No laptops during lecture.
- Check Blackboard regularly for announcements, handouts, etc.
- Read textbook and other material carefully.
- Keep up with all homework assignments.
- Check email regularly.

Assessment Procedures: Tests and quizzes will be given during class time. If any student needs special accommodations, the appropriate paperwork should be turned in to the professor and arrangements made prior to the first graded assignment.

Points will be distributed as follows:

3 Tests	100 points each	300 points
Labs	10 at 20 points each	200 points
Quizzes, etc.	50 points	50 points
Final Exam	200 points	200 points
Total		750 points

Grades will be assigned as follows:
- A (90 - 100): 675-750 points
- B (80 - 89): 600-674 points
- C (70 - 79): 525-599 points
- D (60 - 69): 450-524 points
- F: Below 450 points

Plus/minus may be given for point sums near the cutoff scores.

The Honor Code of Oxford College applies to all work submitted for credit. You will pledge with your signature that the work you submit for credit is yours and yours alone.

Note: Student work submitted as part of this course may be reviewed by Oxford College and Emory College faculty and staff for the purposes of improving instruction and enhancing Emory education.

QTM 100 – Topics

Tentative course schedule.

Wed., Aug. 27	1.1, 1.2, - Variables
Fri., Aug. 29	1.3, 1.4 – Data Sampling
Mon. Sept. 1	Labor Day Holiday
Wed., Sept. 3	1.5, 1.6 –Experiments, Numerical Data
Fri. Sept.5	1.7 – Categorical Data
M, T, W	**Lab1**
Mon. Sept 8	2.1 - Probability
Wed., Sept. 10	2.2 – Conditional Probability
Fri., Sept. 12	2.4 – Random Variables
M, T, W	**Lab 2**
Mon., Sept. 15	2.5 – Continuous Distributions
Wed., Sept. 17	3.1 – Normal Distribution
Fri., Sept. 19	3.2 – Normal Approximation
M, T, W	**Lab 3**
Mon. Sept. 22	3.4 – Binomial Distribution
Wed., Sept. 24	4.1 – Variability in Point Estimates
Fri., Sept. 26	4.2 - Confidence Intervals
M, T, W	**Lab 4**
Mon., Sept. 29	4.3 – Hypothesis testing
Wed., Oct.1	**Review**
Fri., Oct.3	**Test 1**

M, T, W	**Lab 5**
Mon. Oct. 6	4.4 – Central Limit Theorem
Wed., Oct. 8	4.5 – Other Estimators
Fri., Oct. 10	4.6 – Sample Size
MT, Oct 13,14	Midsemester Break
Wed., Oct. 15	5.1 – Paired Data
Fri. Oct. 17	5.2 – Two Means
M, T, W	**Lab 6**
Mon. Oct. 20	5.3 – One mean t-test
Wed., Oct. 22	5.4 – Two means t-test
Fri., Oct. 24	6.1 – One proportion
M, T, W	**Lab 7**
Mon., Oct. 27	6.2 – Two proportions
Wed., Oct. 29	6.3 – Goodness of Fit
Fri., Oct. 31	6.4 – Independence Test
M, T, W	**Lab 8**
Mon., Nov.3	6.5 – Small Sample
Wed., Nov. 5	**Review**
Fri., Nov. 7	**Test 2**

M, T, W	**Lab 9**
Mon., Nov. 10	7.1 – Line Fitting
Wed., Nov. 12	7.2 – Least Squares, Regression
Fri., Nov. 14	7.2 – cont.
M, T, W	**Lab 10**
Mon., Nov. 17	7.4 – Linear Regression
Wed., Nov. 19	7.4 – cont.
Fri., Nov. 21	8.1 – Multiple Regression
Mon., Nov. 24	8.1 – cont.
W-F, Nov. 26-28	Thanksgiving Break
M, T, W	**Lab 11**
Mon., Dec.1	8.3 – Checking Assumptions
Wed., Dec. 3	5.5 - ANOVA
Fri., Dec., 5	Review
Mon., Dec. 8	**Test 3**

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