STAB22H3 - Statistics I – **Winter 2014**

Instructor: Olga Chilina

Office: IC346

Office hours: Wednesdays 11:00 am – 12:00 pm and Fridays 11:00 am – 12:00 pm

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Webpage: http://www.utstat.toronto.edu/~olgac/stab22_Winter_2014/

Lecture time and location:

LEC01: Wed 10:00 – 11:00 am in AA112

Fri 10:00 – 11:00 am in IC130

Course Objective

This course (in combination with STAB27H3) presents the basic statistical methodology used in many fields of application. It emphasizes concepts and techniques and will be useful to students who seek to gain an understanding of the use of statistics in their own fields. Our ultimate goal is to gain understanding from data, going from data collection to analysis to conclusions. Content, emphasis, etc. of the course is defined by means of the lecture material - not only the texts. It is important to attend all lectures. There will also be many lecture examples using statistical software, which students will be using. Important announcements, problem sets, additional examples, and other course info will be posted on either the course web homepage or the blackboard. Check those regularly.

Tutorials

Tutorials begin January 13 (second week of classes). Tutorial rooms can be found here:
http://www.utsc.utoronto.ca/~registrar/scheduling/timetable
Problem assignments will be posted on the course web site. They are due at tutorials, for discussion only.

Texts/Software:

(1) Stats: Data and Models, DeVeaux, Velleman, Bock, Vukov, Wong Canadian edition, publ. Pearson Canada. **Do not purchase U.S. editions of the text.**
(2) StatCrunch (CD comes with the textbook if you buy a bundle)

Evaluation

- Tutorials (based on quizzes): 20% - quizzes will be held during tutorials and will last approximately 10 minutes. They will cover material from the previous week of lectures.
- Term Test: 30% - a two-hour test on a date to be announced.
- Exam: 50% - a three-hour final exam.

The midterm test and the final exam are based on multiple-choice questions.

Quizzes

Quizzes will be given in tutorial. Your TA will record your mark for each quiz. So be sure to attend the correct tutorial, and to know your TA's name. **There are no make-up quizzes!** In case of legitimate absences, you should provide supporting documents within one week of the missed quiz and then the related quiz will be forgiven and the tutorial grade will be based on the remaining quizzes. If no supporting documents are provided, then that quiz will be given zero credit.

Midterm Test/Final Exam

The date and time of the term test are: TBA. It will be written in various rooms across campus - check the course web page or blackboard later for locations. If you have a time conflict, please let me know two weeks before the test date. **Programmable calculators are not permitted on tests and exam**. One double-sided 8-1/2"x 11" aid sheet, hand-written, is allowed on the test (two on the final exam). **You must bring your student identification to the term test as well as the final exam.** The day and time for the final exam will be announced later.

Missed Tests

There are **no make-up tests**. Should you miss the term test due to illness, you must submit to your lecturer within one week, completed by yourself and your doctor, **the 'U of T Student Medical Certificate'.** The test's weight will then be shifted to the final exam. **If this documentation is not received, your test mark will be zero.**

Computing

Students will be using, StatCrunch for computing. No previous computing experience is assumed. With this software, you will analyze the data sets used in the text exercises.
The data sets can be found on the CD accompanying the textbook, and on the publisher's web site.
You will use StatCrunch on many assignments. Bring to tutorial the full computer output, along with your written answers.

Academic Offences

Academic offences are unacceptable, and harm everyone. Cheating and plagiarism are taken very seriously at the University of Toronto. Academic offences are treated as a threat to the integrity of the institution as a whole and the penalties can be quite severe.

Accessibility Needs

Students with diverse learning styles and needs are welcome in this course. In particular, if you have a disability/health consideration that may require accommodations, please feel free to approach me and/or the AccessAbility Service as soon as possible. Inquiries are confidential. The UTSC AccessAbility staff (located in S302) are available by appointments to assess specific needs, provide referrals and arrange appropriate accommodations. You can contact them at (416) 287-7560 or ability@utsc.utoronto.ca

Tentative Lecture Outline (subject to change)

Textbook (SDM 1st Cdn edition by DeVeaux, et al) chapter references are in parentheses.

Week 1: Introduction to course, overview. Cases and variables, categorical & quantitative variables. Worksheet organization of data. Bar charts & pie charts for categorical variables. Two way tables; marginal and conditional distributions. Simpson's paradox. Introduction to StatCrunch. (1-3)

Week 2: Quantitative variable plots: dotplots, histograms, stem and leaf plots. Shapes of distributions, outliers. Sample mean, median, mode, trimmed mean. Resistant measures. Standard deviation. The empirical rule. (4)

Week 3: Percentiles. 5-number summary and boxplots. Z-scores. Linear and non-linear transformations of data. Density curves and the normal distribution. Normal probability (quantile) plot. (5-6)

Week 4: Bivariate data: scatterplots & correlation. The least-squares line, coefficient of determination, residual plots, outliers & influential observations; lurking variables, association & causality. (7-9)

Week 5: Collecting data: Observational studies and randomized experiments. Sample vs population characteristics. Random samples. Designing experiments: comparison, randomization, blocking, factorial design. (12-13)

Week 6: Probability and relative frequency. Sample space, outcomes, and events. Rules of calculation for probabilities. Conditional probability (with a Bayes example via tree diagram). Statistical independence. (14-15)

Week 7: Discrete random variables and probability functions. Expectation (mean) and variance of random variables and linear combinations (e.g. sums, differences, averages). The binomial distribution, applications, mean and variance (using sums of Bernoulli variables), the sample proportion. (16-17)

Week 8: Continuous random variables and density functions. The normal approximation of binomial. Sampling distributions. Distribution of the sample mean. The Central Limit Theorem. (17-18)

Week 9: Margin of error, confidence intervals for μ (with known variance) and p, sample size. Statistical tests of hypothesis: observed and fixed levels of significance (P-value, α-level). Tests for μ (with known variance) and p. (19-20)

Week 10: Decision errors - types I & II, and power (with a z-test calculation). Testing hypotheses via confidence intervals. Test & C.I. for μ with unknown variance: the Student t distribution. Robustness of t procedures. (21, 23)

Week 11: Two independent samples: z-test & C.I. for comparing the means. Small sample t-tests comparing two population means: pooled & unpooled variance procedures. (24-25)

Week 12: Comparing proportions with z-test. Overview of inferential procedures. (22)