UNIVERSITY OF TORONTO
STA220H1F-The Practice of Statistics
Summer 2016

Instructor: **Dr. Z. Liu**	Email	zizhen@utstat.utoronto.ca
	Telephone	TBA
	Office	6027D, Sidney Smith Hall
	Office Hour	Tuesdays, Thursdays 5:00 - 6:00pm
Lectures	Day and time	**Tuesdays, Thursdays 7:00 - 10:00pm**
	Location	**MC102**
Tutorials	Day and time	Tuesdays, Thursdays 6:00 - 7:00pm
	Location	To be posted on the course web page by 11 am, May 12. Please attend your registered tutorials led by your respective Teaching Assistant (TA) at a right location.
Course website		**http://portal.utoronto.ca**

Course Description
This course presents the basic statistical methodology used in many fields of application. It emphasizes conceptual reasoning and the basic techniques that will be useful to students who seek to gain an understanding of the use of statistics in their own fields. This course convers the topics in descriptive and inferential statistics such as methods of data collection, probability, discrete and continuous probability distributions, central limit theorem, sampling distribution, statistical inference, confidence intervals and hypothesis test.

Learning objectives
- Understand the ideas, principles, and considerations that are common to all statistical methods
- Develop a statistical toolbox of some methods for the collection, analysis, and display of data
- Identify appropriate uses of the statistical methods, including their strengths and limitations, and
- Develop statistical literacy, including the ability to recognize the importance of data in decision-making and understand the social and scholarly applications of statistics.

Course webpage/Blackboard
The link to the course Blackboard is http://portal.utoronto.ca. Relevant course material will be made available on the Blackboard. Announcements, dates, problem sets, assignments, tutorials and aid centre information, and etc. will be posted on the Blackboard. So visit the Blackboard regularly.

Required Textbook
Stats: Data and Models, 2nd Canadian Edition, by DeVeaux, Velleman, Brock, Vukov and Wong (Pearson).

Computing Software
We will use R for computing examples. R is freely available for download at http://cran.r-project.org for Windows, Mac, and Linux operating systems. For the test and exam, you may be asked to interpret outputs from R.

Calculators
You will need a calculator in the test and exam. Any calculator that has logarithmic functions will be sufficient. Programmable calculators are not permitted on the test or exam. Calculators on phones or other devices equipped to communicate with the outside world will not be permitted during the term test and the final exam.

Tutorials
- The major purpose of tutorial is discussion and review of course material; no new material will be covered. Bring to tutorial your solutions for the current tutorial assignment (posted on the course blackboard).
- Assignment #1 (to be posted at the web site) is due at your first tutorial, and similarly for Assignment #2 and so forth. These assignments will be discussed in tutorials.
- There will be some assessment grade at each tutorial (0 - 10 scale) based on either a short quiz or classroom discussion/participation or submission of part of the current assignment. These are meant to be easy marks to encourage you to keep up with the work, and are not very meaningful feedback on your achievement level or preparedness for tests. At the end of term, your TA will submit a 0 - 10 grade for you based on the average of all tutorials/quizzes. We expect the majority of students who make a steady reasonable effort to receive at least 9 marks out of 10. Don't throw away these relatively easy marks.
- Attendence records are kept by your TA so please attend the one you are properly enrolled in to prevent missing marks. If you miss a tutorial/quiz for any reason, please discuss with your TA, and not the instructor. Your TA has full responsibility for their respective tutorial section. If ill, bring some proof for your TA.

Additional Sources of Help
Your primary source of help with difficulties is your TA in the scheduled tutorial, but additional assistance will be available at the Statistics Aid Centre, Room 1091 , in Sidney Smith Hall. A schedule will be posted at the course website. TAs will be available for help every week, and feel free to drop in.

Evaluation

Type	Weight	Tentative Due Date	Location
Tutorials	10%	Tuesdays, Thursdays 6:00 - 7:00pm (Starting from May 12 to June 16 except June 2)	Your tutorial room
Test	35%	6:00 - 7:30pm Thursday, June 2 (followed by lecture starting from 7:40pm)	TBA
Final exam	55%	TBA (June 20 - 24)	TBA

Important Date
The last day to drop F section code courses from academic record and GPA (without academic penalty, i.e. drop date) is June 6, 2016.

Missed Test
There are no make-up tests. Should you miss the term test due to illness, you are required to submit, within one week the proper University of Toronto "Verification of Student Illness or Injury" form.
For more information, go to http://www.illnessverification.utoronto.ca.
The test's weight will then be shifted to the exam. If this documentation is not received, your term test grade will be zero.

Lecture Schedule – Tentative

Week	Topics
Week 1-2 (Chapter 1 - 5, 9 - 11)	**Overview**: statistics and data. **Data**: cases and variables, categorical & quantitative variables, worksheet organization of data. **Study design and data collection**: observational studies and randomized experiments, sampling methods -SRS, stratified, systematic, and cluster, randomization, blocking, factorial design, sampling and non-sampling errors, bias, confounding, causation, sample vs population characteristics. **Descriptive statistics**: summary statistics and tables, relative frequency distribution, bar charts and pie charts for categorical variables, two way tables, marginal and conditional distributions, dot plots and histograms for quantitative variables, Simpson's paradox, shapes of distributions, outliers, stem and leaf plots, time plots, sample mean, median, mode, standard deviation, the empirical rule, percentiles, 5-number summary and boxplots, z-scores, transformations of data, density curves and the normal distribution. **Introduction to R.**
Week 2-3 (Chapter 12-14)	**Probability**: sample space, outcomes, and events, addition rules, multiplication rules, tree diagram for calculation of probabilities, conditional probability, independence, Bayes theorem. **Discrete probability distributions**: binomial distribution, Poisson distribution. **Continuous probability distributions**: normal distribution, the standard normal distribution, normal approximation of binomial distribution.
Week 3-5 (Chapter 15 - 18, 20)	**Sampling distributions**: Distribution of the sample mean (and total). The Central Limit Theorem (CLT) for means and proportions. **Inferential statistics**: confidence intervals (CIs) and hypothesis testing, statistical decisions, Type I and Type II errors, p-values, significance levels, margin of error, critical values. **One-sample inference**: z-CIs and z-tests for population means, z-CIs and z-tests for population proportions, exact and plus 4 CIs for population proportions, t distributions, t-CIs and z-tests for population means including pooled & un-pooled variance procedures.
Week 5-6 (Chapter 19, 21 - 23, 6 - 8)	**Two-sample inference**: large sample z-tests and CIs for two independent means and proportions, small sample t-tests for two independent population means including pooled and un-pooled variance procedures, paired t-test for two dependent population means. **Categorical data analysis**: Chi-square distributions, goodness-fit test, test for independence. **Correlation and regression**: scatterplots, correlation, regression, least-squares fit, coefficient of determination, residual plots, outliers and influential points, lurking variables, association and causality.

Academic Offences
Academic offences are unacceptable and harm everyone. E.g., some students have been known to alter a test paper after it is graded, and then re-submit it hoping for more marks! But, offenders are caught, and sanctions can be severe - zero in the course with annotation on the transcript for several years; suspension for a year; even expulsion. Various measures, announced and unannounced, will be taken throughout the year to reduce their incidence and to ensure successful prosecution (photocopying of graded tests, multiple versions of multiple choice exams, etc.). And please carefully note the following:
- Requests for a written test remark may only be considered if you write your test in ink.
- Grading oversights such as addition errors and overlooked work must be reported to your TA immediately upon receiving your test paper at class. So check it over as soon as you get it back.

Feel free to discuss weekly assignments with others, but in the end, be sure to do all the computations, work and final write-up by yourself (i.e. plagiarism is unacceptable).

Accessibility Needs
The University of Toronto is committed to accessibility. If you require accommodations for a disability, or have any accessibility concerns, please contact Accessibility Services as soon as possible at:
disability.services@utoronto.ca or http://studentlife.utoronto.ca/accessibility