STATISTICS 250H1 – Statistical Concepts (Fall 2005)
Course homepage at: http://ccnet.utoronto.ca/20055/sta250h1s
Lecturer: Augustin Vukov, Office hrs: Tuesday & Thursday 4:15-5:30pm in SS6025 (416-9784722)

This course presents the basic statistical methodology used in many fields of application. The emphasis of this course is on concepts and techniques and will be useful to students who seek to gain an understanding of the use of statistics in their own fields. For further studies in Statistics, you need to also take STA255, which will provide more of the theoretical and mathematical development required.

Tutorials - starting Sept 22

Tutorials meet one hour per week. Weekly problem assignments will be posted at the course web site. They are due at tutorial (for discussion, hand-in and/or quizzing). The major purpose of the tutorial is to go over the assignment and associated material; no new material will be covered. All records are kept by tutorial so please attend the correct one, as **missing marks** often arise when students attend tutorials they are not enrolled in. **The location of your tutorial will be posted on the web page,** prior to 7pm Sept 21.

There will be some brief assessment at each tutorial – perhaps a short quiz based on the assignment; perhaps you'll be asked to submit your solutions for one or two of the assigned questions; perhaps your TA will have other good ideas. At the end of term, your TA will submit a grade 0 -10 for you. This grade is meant to be an encouragement and reward for keeping up and doing the required work. Make a good, consistent effort and you can expect 9 or 10 marks out of a maximum of 10 marks. If you miss a tutorial/quiz due to illness, late enrolment, etc., bring an appropriate note to your next tutorial - *your TA has full discretionary power* to deal with such matters.

Course Contents

Content, emphasis, etc. of the course is defined by means of the lectures - *not the text.* It is important to attend all lectures, as there is normally no simple way to make up for missed lectures. **Important announcements**, problem sets, and other course info will be posted on the **course web homepage** (see above). ***Check it regularly.***

Required Texts

Introduction to the Practice of Statistics (5thed.) - Moore and McCabe *(Freeman).* Do not purchase the 4th edition of the text.
Highly recommended: The above textbook bundled together with Minitab statistical software (at a greatly reduced price for Minitab)
Additional references: *Minitab Workbook* – A. Vukov *(Canadian Scholar's Press)*
Avoid some frustration, and order your books online from the bookstore: www.uoftbookstore.com/online/
At the publisher's web site, www.whfreeman.com/ips5e, there are additional learning aids such as online quizzes, supplementary exercises, and interactive applets. A study guide (by M. A. Fligner) for the Moore/McCabe text is also available (order at the bookstore).

Statistics Aid Centre: SS2133 (from Sept 19)

Your primary source of help with difficulties is your tutor in the scheduled tutorial, but additional assistance can be obtained at the Statistics Aid Centre, Room 2133, in Sidney Smith Hall. A schedule will be posted at the website and outside the Stats Dept Office (SS6018). Your own TA will be on duty there one hour per week, but you can drop in on any Sta250 TA present.

Also check out the *New College Aid Centre (room 55B),* which will have one highly qualified Stats Dept TA (John Sheriff) present at least 8 hours per week, to help with several intro stats courses including STA250.

Additional Help

Student electronic bulletin board (see web page) – *communicate with other students in the course.*
Dept of Statistics – for general administrative queries only: stats@utstat.utoronto.ca (phone: 416-9783452)

Academic Offences

Academic offences are totally unacceptable and harm everyone. E.g., we have found that some students will alter a test paper after it is graded, and try re-submitting it! 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.). Also, please note the following:

> **Requests for a test remark** will be considered only if you **_write your test in ink._**
>
> **_Grading oversights_** such as addition errors and overlooked work must be reported to your TA **_immediately_** after your test paper is returned to you. So check it over right away.

Final Comments

For most students, *Statistics* is a new subject. Like most new subjects, it seems difficult at first but simple in retrospect. Many new concepts will be introduced and built upon. The course will be far easier and more useful if you master concepts as they are introduced - similar to learning a new language. Doing the exercises is not like calisthenics or jogging, which are good for you no matter how your mind wanders as long as you go through the motions. Think about the objectives of the study, why a particular method was used, and what has been learned about the original questions that motivated the study!

The lecturers and TA's are there to help. Ask questions! If you have any comments or suggestions about the course, please tell us. We want to know what is good; we want to know when problems are developing. Remember that it takes time for information to travel and for action to be taken. Therefore, if you become aware of any problems, mention this to your instructor(s) right away.

TENTATIVE LECTURE GUIDE

IPS (Introduction to the Practice of Statistics) chapter references are in parentheses. Do many of the odd exercises for practice - answers are in the back of IPS

Lecture 1: Types of data. Descriptive graphs: stem plots, histograms, boxplots. Measures of centre and dispersion. Transformations of data. (chap 1)
Lecture 2: Normal distribution. Bivariate data. Correlation. (chap 1, 2)
Lecture 3: Fitting by least-squares. Sample surveys and probability samples. (chap 2, 3)
Lecture 4: Experimental design concepts. Some basics of probability. (chap 3, 4)
Lecture 5: Random variables, expected values, variance. Binomial distribution. (chap 4, 5)
Lecture 6: Central Limit Theorem. Estimation and confidence intervals. (chap 5, 6)
Lecture 7: Significance tests. P-values. Type I, type II errors. (chap 6)
Lecture 8: The t-distribution: testing means in single samples, paired data and independent samples. (chap 7)
Lecture 9: Categorical data – testing proportions via the z-test. Chi-square test for categorical data. (chap 8, 9)
Lecture 10: The regression model. Inference for regression. Multiple predictors. (chap 10, 11)
Lecture 11: Multiple regression and the General Linear Model. One-way ANOVA (chap 11, 12)
Lecture 12: Two-way and multi-way ANOVA. Non-parametric tests. (chap 13, 15)
Lecture 13: Catch up week (finish off earlier topics). Introduction to bootstrapping. Final case study (AZT trials). Overview. (chap 14)