Stat 100: Statistical Thinking

The following is a guide to the course Stat 100, Statistical Thinking, as given in the second Winter term of the academic year 2011-12.

Course aims: The course explores the development and use of statistical thinking in the modern world. The aim is to equip students with a good level of statistical literacy while also demonstrating applications of the discipline in research and society. Detailed objectives for each module will be found on the appropriate page on the course web page. You are advised to refer to these outcomes during a module to clarify the outcomes you are expected to attain.

Pre-requisites: Principles of Mathematics 12 or Pre-Calculus 12.

Lecturers: The course is modular in nature, and there will be six modules presented. The confirmed instructors to date are:

Dr. Paul Gustafson (LSK 326, email: `gustaf@stat.ubc.ca`)

Dr. Jenny Bryan (LSK 325, email: `jenny@stat.ubc.ca`).

Dr. Lang Wu (LSK 324, email: `lang@stat.ubc.ca`).

Dr. Gustafson is the course convenor, and should be contacted for any general queries about the course. He will provide a closing lecture in the final session.

Lectures and seminars: Lectures are Tuesdays and Thursdays, 2pm–3.30pm (in Wesbrook 201). Students also register in one of the seminar sections, either Tuesday (1pm in MATH 204) or Thursday (11am in MATH 204), starting the second week of classes. **Attending and participating in the seminar activities will put students at an advantage for assignments and the final exam.**

Website: The course website (including sub-pages for the individual modules) will be maintained at `www.slate.stat.ubc.ca`.

Clickers: Students will need an **iClicker** for the course (available from the bookstore if you don't have one already from another course). Clickers will first be used in the second week of the course.

Assessment: Each of the six modules will have an assignment related to it. Students are expected to submit all of these, for 48% of the course assessment

(each worth 8%). There will be a final examination carrying a weighting of 48%, with questions on all modules presented. **Regardless of the exam weighting, it is necessary to pass the exam in order to pass the course.** The remaining 4% of the assessment will be allocated to responses to clickers questions given in the lectures, some of this being awarded for participation.

The usual university rules concerning plagiarism apply. Specific details regarding assessment regulations for the course can be found on the course web page. Note in particular that (i) late assignments are not accepted, and (ii) in the case of an assignment missed due to a valid and documented reason (e.g., medical), the weight for that assignment will be transferred to the final exam.

Programme of work: The study time should total around eight hours per week. So in addition to the contact hours, it is essential that learners spend approximately four hours per week on self–study for the course. It is suggested at least two hours per week are spent on revising and assimilating the material covered in the lectures and on guided reading.

Feedback: After all assignments have been submitted and marked, feedback will be provided in the form of brief notes on marked work. Where appropriate, general comments will also be provided on the course web–page.

Recommended texts: There is no recommended text as such, though various resources will available on the course web site and from the library. Instructors for individual modules will indicate appropriate reading material. For the first module, and as a valuable introduction to statistical thinking, a classic book is:
Huff, D. (1955): *How to Lie with Statistics.* Victor Gollancz, London.

The first two modules will be: There follows a provisional guide to the modules. Each module will comprise four lecture slots and two seminars.

1. *Statistical literacy:* The aim here is to create a modernized version of Huff's "How to Lie with Statistics", using contemporary examples from the media for exposition of ideas on sampling, summary statistics and graphical displays. The goal is to ensure we *think* when statistical information is presented to us. (Gustafson)

2. *Probability*: Probability is the study of the uncertainty of events. In

this module, you will be given an intuitive introduction to probability by firstly considering toy examples, using games of chance. Using our intuition gained from studying these games, we will develop the basic laws of probability. We can then consider real world applications, with the goal of convincing the student that probability really is all around us. With a better understanding of probability, the student can better understand occurrences in their everyday lives, and be better equipped to answer the question, *how likely was that?* (TBA)

The remaining four modules for 2011-12 are not yet finalized. One of them will be:

- *Subtleties of statistical evidence:* This module focusses on the need to be careful in interpreting statistical evidence. As a first question, if two variables (say, for instance, coffee consumption and development of cancer) seem to be related, what should we think about a possible *causal* relationship between them? Should we bring other variables into the analysis? As a second question, if we search over many places (all municipalities in B.C., for instance) for elevated incidence of a rare disease - how should we interpret what we find? Do we need to account for the fact that we looked in many places? In this module we will look closely at these questions. (Gustafson)

<div align="right">PG: June 23, 2011</div>