UNIVERSITY OF WATERLOO

WATERLOO ONTARIO

STATISTICS 221

INTRODUCTION TO STATISTICAL METHODS 2

Course Materials

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Statistics 221 is the second course of a four-course sequence provided for students in the 3-year Bachelor of Mathematics general program; this sequence is designed to develop knowledge of, and skills in, the subject of Statistics. Relevant background information is as follows:

- The sequence of courses is: **STAT 220** ⟶ **STAT 221** ⟶ **STAT 322** ⟶ **STAT 324**
- For students in the 3-year (or 'general') BMATH program, STAT 220 and STAT 221 are *required* courses, STAT 322 and STAT 324 are *optional* but are strongly recommended for students with an interest in statistics (or in applied quantitative methods of investigation).
- Each course has, as statistics prerequisite(s), the course(s) to its left in the flow diagram above.
- The *mathematics* prerequisite for STAT 220 is an appropriate level of differential and integral calculus (*e.g.*, MATH 127).
- STAT 220 and STAT 221 are general in scope whereas STAT 322 is concerned with two specific areas of application of statistical methods (*survey sampling* and *experimental design*); the emphasis in STAT 324 is on computing with statistical software.
- Each of the four courses is offered only *once* on campus per academic year – STAT 220 and STAT 322 in the Fall term, STAT 221 and STAT 324 in the Winter term; STAT 220 and STAT 221 are also offered by Distance Education in the Winter and Fall terms respectively.

Note that there are a number of one- and two-term statistics courses with overlapping content offered at the University of Waterloo. If you take STAT 220 and/or STAT 221 *as well as* a one-term course (such as CHE 022, CIVE 224, ENVE 224, ECON 221, ENVS 278, ISS 250R, KIN 222, MSCI 251, ME 202, PSYCH 292, PSCI 214, REC 371, SOC 280, STAT 202, STAT 204, STAT 211), you will usually obtain credit for one *fewer* than the number of these courses you pass.

2005-12-01

NOTE: Please be *sure* you are going to take this course this term – there are *no* refunds on these Course Materials.

Content overview for STAT 220 (about 37 lectures):

- **Part 1**: The subject of statistics (about 1 lecture).
- **Part 2**: Data characteristics and features: an introduction to measuring (about 3 lectures).
- **Part 3**: Pictorial and tabular methods of data presentation (about 2 lectures).
- **Part 4**: Numerical data summaries (about 3 lectures).
- **Part 5**: Continuous distributions as probability models (about 7½ lectures).
- **Part 6**: Modelling the behaviour of sample averages: interval estimating (about 2 lectures).
- **Part 7**: An introduction to discrete probability (about 9½ lectures).
- **Part 8**: An introduction to sample surveys (about 5 lectures).
- **Part 9**: Relationships: association and causation (about 4 lectures).

Content overview for STAT 221 (about 37 lectures):

- **Part 10**: Further discrete probability models (about 10 lectures).
- **Part 11**: An introduction to industrial problem solving (about 7 lectures).
- **Part 12**: An introduction to tests of hypothesis and tests of significance (about 13 lectures).
- **Part 13**: An introduction to simple linear regression (about 7 lectures).

The break in the material between STAT 220 and STAT 221 is due *only* to the time constraints on one-term courses; it is best to regard the overall content of the two courses as the logical development of *one* inter-related set of topics.

COURSE CALENDAR

Lecture times are 10.30 a.m. on Monday, Wednesday and Friday in room CPH 3386, and the weekly tutorial is at 3.30 p.m. on Thursday in CPH 3386. Lectures begin on Tuesday, January 3, 2006, and end on Wednesday, March 29, 2006; the Mathematics Winter Reading Days are Thursday and Friday of the week of February 20, and the Good Friday University holiday is Friday, April 14 (in the examination period). A tentative schedule of course activities is given in the following table; note that the tutorial time slots in the *first* and *third* weeks of term are used as *additional lectures*.

WEEK STARTING		LECTURE/TUTORIAL NUMBER Lect. 1	Lect. 2	Tutorial	Lect. 3	OTHER COURSE OBLIGATIONS
January	2	---	L1	L2	L3	-----
	9	L4	L5	T1	L6	Assignment 1 due on January 13 (F)
	16	L7	L8	L9	L10	-----
	23	L11	L12	T2	L13	Assignment 2 due on January 27 (F)
	30	L14	L15	T3	L16	Assignment 3 due on February 3 (F)
February	6	L17	L18	T4	L19	Quiz #1 on Thursday, February 9
	13	L20	L21	T5	L22	Assignment 4 due on February 17 (F)
	20	L23	L24	---	---	----
	27	L25	L26	T6	L27	Assignment 5 due on February 27 (M)
March	6	L28	L29	T7	L30	Assignment 6 due on March 10 (F)
	13	L31	L32	T8	L33	Quiz #2 on Thursday, March 16
	20	L34	L35	T9	L36	Assignment 7 due on March 27 (M)
	27	L37	Review	---	---	Assignment 8 due on March 29 (W)