

THE UNIVERSITY OF CALGARY
FACULTY OF SCIENCE
DEPARTMENT OF MATHEMATICS & STATISTICS
Course Information Sheet

Course	STAT 421: MATHEMATICAL STATISTICS	Session	Fall 2004
Lecture	L01 MWF 10:00-10:50 am	Room	ST 147
Tutorial	T 10:00-10:50 am	Rooms	MS 317, 427, 431
Homepage	www.math.ucalgary.ca/~adeleon/stat421.html		
Instructor	Alex R. de Leon		
Email	adeleon@math.ucalgary.ca		
Office	MS 554	Phone	220-6782
Office Hours	Whenever I'm in my office or by appointment		
Prerequisite	MATH 323		

NOTE: The Faculty of Science policy on pre- and co-requisite checking is outlined on page 199, of the 2004-2005 Calendar. **It is the students' responsibility to ensure that they have the prerequisite for the course, and if they do not they will be withdrawn from the course without further notice.**

- 1 Fee Policy:** After the last day to drop/add courses (**September 21**, Tuesday), there will be no refund of tuition fees if a student withdraws from a course, courses or the session.
- 2 Grading:** The University policy on grading and related matters is described on pages 43-44 of the 2004-2005 Calendar. In determining the overall grade in the course, the following weights will be used:

Midterm Test I	[1]	25%
Midterm Test II	[1]	25
Final Exam	[1]	50

There will be a final examination scheduled by the Registrar's Office. The use of aids such as open book, etc., is not permitted.

- 3 Missed Components of Term Work:** The regulations of the Faculty of Science pertaining to this matter are outlined on page 200 of the 2004-2005 Calendar. It is the student's responsibility to familiarize himself/herself with these regulations.
- 4 Academic misconduct** (cheating, plagiarism, or any other form) is a very serious offence that will be dealt with rigorously in all cases. A single offence may lead to disciplinary probation or suspension or expulsion. The Faculty of Science follows a *zero tolerance policy* regarding dishonesty. Please read the sections of the 2004-2005 University Calendar under the heading "Student Misconduct", pages 53-56.
- 5 There will be no out-of-class-time activities.**

6 **Required Text:**

Introduction to Mathematical Statistics (Sixth Edition)
by Hogg, R. V., McKean, J. W., & Craig, A. T.
Pearson Prentice Hall, 2005.

7 **Tests:** Both midterm tests and final test are **closed-book-no-notes** examinations. The midterm tests are 45-minute tests to be written during a lecture class (see Item 10 or Table 1) while the final test is a 2-hour test to be scheduled by the Registrar's Office.

8 **General Comments:** This is a statistics course in which mathematical techniques and statistical applications are blended at a relatively high level. Some helpful tips are as follows:

- Rewrite your notes in your own words **after each lecture** to make sure that you understand the material.
- Don't hesitate to see me right away if the lecture material is not clear to you.
- Read the textbook regularly.
- **On problem-solving questions in tests:** Try to include a sufficient amount of explanation so I will not have to guess what you mean. I will want to see that you understand what you are writing, not merely that you arrive at the correct answer.

9 **Tutorials:** Once-a-week 50-minute lab tutorials have been booked for the course in MS 431, MS 427, and MS 317. These sessions are devoted to working out solutions to assigned exercises from the textbook. Questions and clarifications may also be asked of the tutor-on-duty regarding any topic concerning the course.

10 **Dates to remember:**

September 14, 2004	<i>First tutorial session</i>
October 1, 2004	<i>Mid-Term Test I</i>
November 10, 2004	<i>Mid-Term Test II</i>
November 11-14, 2004	<i>Reading Days (No Classes)</i>
December 7, 2004	<i>Last tutorial session</i>
December 8, 2004	<i>Last lecture class</i>

11 **Grading System:** At the end of the term, a summary score will be computed from the quizzes and test marks which will be used to rank everyone in order of merit. I will then decide whether the class as a whole is average, above average or below average, which will determine how many students should fall into each of the possible letter grades. The grades will be assigned accordingly and they will reflect my judgment and assessment of both absolute achievement and relative performance in the class. **No fixed scale will be used to convert your end-of-term summary scores to letter grades.**

12 **Course Webpage:** Handouts and other relevant supplementary materials may be downloaded from the course **blackboard**. Go to www.math.ucalgary.ca/~adeleon and follow the links.

Table 1: *Tentative STAT 421 L01 Course Outline*

Lecture	Date	Readings	Topics
1	W Sept 8	Ch. 1-3	Preliminaries, review of RVs & dist'ns
2	F Sept 10	Ch. 5	Framework of inference
3	M Sept 13	§ 5.1	Statistics, sampling dist'ns
4	W Sept 15	§ 1.6-1.7,2.7; Ch. 5	Examples of statistics & their sampling dist'ns
5	F Sept 17	§ 4.3	Asymptotic theory, convergence in distribution
6	M Sept 20	§ 4.3	Examples, MGF technique
7	W Sept 22	§ 4.2	Convergence in probability, WLLN
8	F Sept 24	§ 4.4	Central Limit Theorem (CLT)
9	M Sept 27	§ 4.4	Applications of CLT
10	W Sept 29	§ 5.5	Slutsky's Theorem & applications
	F Oct 1	Midterm Test I	
11	M Oct 4	§ 5.1	Estimation: notations, method of moments (MME)
12	W Oct 6	§ 6.1	Maximum likelihood estimation (MLE)
13	F Oct 8	§ 6.1,6.4	More on MLE
14	W Oct 13	Ch. 4; § 7.1	Optimality of estimators, MVUEs
15	F Oct 15	Ch. 4	Some examples
16	M Oct 18	§ 6.2	Rao-Cramér Inequality
17	W Oct 20	§ 6.2	More examples
18	F Oct 22	§ 7.3	In search of MVUEs: Sufficient statistics
19	M Oct 25	§ 7.3	Factorization Theorem
20	W Oct 27	§ 7.3	Rao-Blackwell Theorem
21	F Oct 29	§ 7.5	Exponential class of dist'ns
22	M Nov 1	§ 7.4	In search of MVUEs: Complete statistics
23	W Nov 3	§ 7.4	Lehmann-Scheffè Theorem
24	F Nov 5	Ch. 7	Recap on MVUEs
25	M Nov 8	Ch. 6	Optimality of MLEs
	W Nov 10	Midterm Test II	
Nov 11-14: READING DAYS			
26	M Nov 15	§ 5.4	Confidence intervals (CI), pivots
27	W Nov 17	§ 5.4	Examples of CIs
28	F Nov 19	§ 5.5	Hypothesis-testing: notations, definitions
29	M Nov 22	§ 8.1	MP tests, Neyman-Pearson Theorem
30	W Nov 24	§ 8.1	Examples of MP tests
31	F Nov 26	§ 8.2	UMP tests, monotone likelihood ratio
32	M Nov 29	§ 8.2	Examples of UMP tests
33	W Dec 1	§ 6.3,8.3	Likelihood ratio test (LRT)
34	F Dec 3	§ 6.3,8.3	Examples of LRTs
35	M Dec 6	§ 5.6	Two-sided tests vs. CIs: Equivalence
36	W Dec 8	§ 5.4	Normal models: One- & two-sample cases