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University of Victoria

Faculty of Science | Department of Mathematics and Statistics
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Course Outline
STAT 261: Introduction to Probability and Statistics II
Spring 2018, CRN: 22897

Instructor

Lecturer: Prof. M. Lesperance, Ph.D., P.Stat.
Research Area: Biostatistics, Mixture models, Bayesian methods, applications in Medicine and Genomics
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General Course Information

Number of Units: 1.5 [Credit will be granted for only one of STAT 261, 251 or 256]
Pre-requisites: STAT 254 or STAT 260; and one of MATH 101, MATH 103, MATH 140, MATH 208

Office Hours and Assistance

- Office hours will be posted on CourseSpaces after the class has been polled for times.
- Or by appointment (send email to book one).

The Mathematics & Statistics Assistance Centre is a large space where students can go to work, on their own or in groups, and to discuss math & stats problems. The Centre is staffed with talented Teaching Assistants who are happy to discuss primarily first and second year course material with you. Please see http://www.math.uvic.ca/~msassist/index.html for more information.

Math Club Students in Undergraduate Mathematics and Statistics (SUMS) was founded in 2014 as the reincarnation of a previous undergraduate course union that had been inactive for a few years. Please see see http://www.uvic.ca/science/math-statistics/current-students/undergraduate/sums/index.php for more information.

Learning Objectives

This is your first *real* course in Statistical Inference. This course is *different* from other second courses in Probability and Statistics. Most second courses are recipe books of statistical techniques with special formulae for each type of problem. In those courses, students memorize the techniques and regurgitate them on tests and assignments with no real understanding of them. In this course, you will learn the

mathematical/probabilistic foundation for many statistical techniques that are used in practice. With this knowledge, you will have a toolkit so that you can even invent your own methodology for your own statistical models!

Course Materials and Online Resources

Textbook: My complete course notes will be posted on CourseSpaces and they will serve as the main reference for the course.

[Optional Text on reserve: Probability and Statistical Inference, Volume 2, Second Edition, by J.G. Kalbfleisch]

Course webpage: We will be using CourseSpaces (http://coursespaces.uvic.ca/my/) for our on-line course material: homework, due dates, solutions, formula sheets, statistical tables and your grades.

Calculator: The only acceptable calculator is the Sharp EL-510R or the Sharp EL-510RNB. It may be purchased at the UVic Bookstore or elsewhere for about $12. A calculator is permitted in this course.

Statistical Software: We will use the state-of-the-art statistical software, R and RStudio in this course for computations and simulations. They are available for Mac, Windows and Linux and are free to download from: http://cran.stat.sfu.ca/ and https://www.rstudio.com/. We will also use R Markdown, http://rmarkdown.rstudio.com/, a notebook interface which weaves together narrative text and code to produce elegantly formatted output.

Computer Facilities: The Student Computing Facilities are located in BEC, HSD and CLE and are available for drop-in usage. Their hours are posted here: http://www.uvic.ca/systems/facilities/ .

Class Meetings

The class meets on Monday's and Thursday's at 8:30 – 9:50 for lectures in MAC D288. There are three lab sections on Friday's:
- Section B01, 2:30-3:30, CLE A031
- Section B02, 3:30-4:30, CLE A031
- Section B03, 4:30-5:30, CLE A031

First day of lectures is 4 January 2018. First day of tutorials is 12 January 2018.

Specific Topics

- Review of relevant probability theory and distributions
- Likelihood methods
- Two parameter likelihoods
- Tests of significance
- Confidence intervals
- Normal theory (one-sample, two-sample, straight line model)

Evaluation and Grading

Your final percentage grade will be computed according to the following scheme:

Components	Dates	Weights
Assignments, Quizzes	See schedule and TBA	12%
Lab assignments, Quizzes	See schedule and TBA	8%
Midterm	Monday, February 19, 2018	20%
Lab Test	Friday, April 6, 2018	10%
Final Examination	TBA	50%

Assignments: Your assignments will be **marked** on **presentation AND content**.

If you work together on these assignments, it is expected that collaborations be fair in that everyone in a group attempts to do the problems. Straightforward copying is expressly forbidden, and anyone caught doing this will be dealt with severely.   Collaborative work can benefit all participants but `free-riding' at the expense of others is unethical and ultimately unproductive.

Missing work: Regardless of the reason, there will be **no make-up midterm exams**. If you miss a midterm, lab test or assignment due to illness, accident, or family affliction, you should notify me as soon as possible, and provide a written request to be excused as well as supporting documentation. In such cases, your percentage allocation for a missed assignment will be divided evenly among those you did write; for a missed lab test, the percentage allocation will be added to your final exam and for a missed midterm, divided between assignments and exam (with maximum 60% weight for the exam). If you miss an assignment, midterm or lab test and the absence is not excused, zero marks will be awarded.

Accessibility: Students with diverse learning styles and needs are welcome in this course. In particular, if you have a disability/health consideration that may require accommodations, please feel free to approach me and/or the Centre for Accessible Learning (CAL) as soon as possible. The CAL staff are available by appointment to assess specific needs, provide referrals and arrange appropriate accommodations http://uvic.ca/cal. The sooner you let us know your needs the quicker we can assist you in achieving your learning goals in this course.

Grading: Percentage scores are converted to letter grades according to the university-wide standard table

Undergraduate: https://web.uvic.ca/calendar2018-01/undergrad/info/regulations/grading.html

Final Examination: Off-schedule final examinations (i.e., deferred examinations) are given only in accordance with the university policy as outlined in the Calendar. If you are unable to write a final examination due to illness, accident or family affliction, please refer to the following webpages for detailed instructions how to proceed: https://web.uvic.ca/calendar2018-01/undergrad/info/regulations/concessions.html

Students are strongly advised not to make plans for travel or employment during the final examination period as special arrangements will not be made for examinations that conflict with such plans.

Supplemental Examinations: The Department of Mathematics and Statistics does not award 'E' grades or offer Supplemental Examinations in any of its courses.

Policies and Ethics

Attendance: The university Calendar states 'Students are expected to attend all classes in which they are enrolled.' Our courses are conducted on that basis. If you miss an announcement (information concerning midterms, corrections to assignment, etc.) because you did not attend class, you must accept the consequences of not having learned of the change. (see https://web.uvic.ca/calendar2018-01/undergrad/info/regulations/attendance.html).

Guidelines on Religious Observances: Where classes or examinations are scheduled on the holy days of a religion, students may notify their instructors, at least two weeks in advance, of their intention to observe the holy day(s) by absenting themselves from classes or examinations. Instructors will provide reasonable opportunities for such students to make up work or missed examinations.

Academic Integrity: Academic integrity is intellectual honesty and responsibility for academic work that you submit individual or group work. It involves commitment to the values of honesty, trust, and responsibility. It is expected that students will respect these ethical values in all activities related to learning, teaching, research, and service. Therefore, plagiarism and other acts against academic integrity are serious academic offenses.

The responsibility of the institution: Instructors and academic units have the responsibility to ensure that standards of academic honesty are met. By doing so, the institution recognizes students for their hard work and assures them that other students do not have an unfair advantage through cheating on essays, exams, and projects.

The responsibility of the student: Plagiarism sometimes occurs due to a misunderstanding regarding the rules of academic integrity, but it is the responsibility of the student to know them. If you are unsure about the standards for citations or for referencing your sources, ask your instructor. Depending on the severity of the case, penalties include a warning, a failing grade, a record on the student's transcript, or a suspension.
It is your responsibility to understand the University's policy on academic integrity: https://web.uvic.ca/calendar2018-01/undergrad/info/regulations/academic-integrity.html

Course Experience Survey

I value your feedback on this course. Towards the end of term, as in all other courses at UVic, you will have the opportunity to complete an anonymous survey regarding your learning experience (CES). The survey is vital to providing feedback to me regarding the course and my teaching, as well as to help the department improve the overall program for students in the future. When it is time for you to complete the survey you will receive an email inviting you to do so. You will need to use your UVic netlink ID to access the survey, which can be done on your laptop, tablet, or mobile device. I will remind you and provide you with more detailed information nearer the time but please be thinking about this important activity during the course. The link for CES is: http://www.ltc.uvic.ca/initiatives/CES.php

How to Succeed in This Course
As with any course in Statistics, it is important to read the course material and do the exercises/homework to succeed!

Course Schedule (Dates are approximate)

Week beginning	Mon. Thurs. lectures	Lecture Assignment due Thursday in class	Friday - LAB Lab Assignment due in lab
Jan 1	Review Stat260, Distributions *Chapter 1		no lab
Jan 8	*Sections 2.1 - 2.3 **9.1	Assignment/Quiz #1	
Jan 15	*Sections 2.4 - 2.7 **9.2, 9.3, 9.4, 9.6	Assignment/Quiz #2	
Jan 22	*Chapter 3, 4.1 **10.1, 12.1 ,12.2		Lab assignment #1
Jan 29	*Sections 4.2 – 4.4 **12.2, 12.3, 12.4	Assignment/Quiz #3	
Feb 5	Review for midterm, midterm Mon. Feb 19		Lab assignment #2
Feb 12	Reading Break		Reading Break
Feb 19	Midterm *Sections 4.5 - 4.6 **12.5, 12.6		
Feb 26	*Sections 4.7 – 4.8, 5 **12.7, 11.4		Lab assignment #3
Mar 5	*Sections 6.1, 6.2 **13.1, 13.2, 13.3	Assignment/Quiz #4	
Mar 12	*Sections 6.2, 6.3 **13.3, 13.4		Lab assignment #4
Mar 19	*Sections 6.3, 6.4 **13.4, 13.5, 13.6		
Mar 26	*Sections 6.4, 6.5 **13.6, 13.7	Assignment/Quiz #5	Lab test
Apr 2	Review for exam		

*Course Notes on CourseSpaces

**Optional textbook: Probability and Statistical Inference, Volume 2, Second Edition, by J.G. Kalbfleisch

Important academic dates:

Classes begin – Wednesday, January 3, 2018
Drop (100% Fee Reduction) – Tuesday, January 16, 2018
Last Day to Add Courses – Friday, January 19, 2018
Drop (50% Fee Reduction) – Tuesday, February 6, 2018
Reading Break (no classes) – February 12 – 16, 2018
Academic Drop Date – Wednesday, February 28, 2018
Good Friday (no classes) – March 30, 2018
Easter Monday (no classes) – April 2, 2018
Last day of classes – April 6, 2018
Examination period – April 9 – 24, 2018