



University
of Victoria

Faculty of Science | Department of Mathematics and Statistics
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COURSE OUTLINE STAT 464/564: Statistical Computing

General Course Information

Pre-requisites All of MATH 211, STAT 261 or STAT 359, and STAT 350 with a grade of C+ or higher; or permission of the department.

TWF 9:30-10:20, Mac D111, CRN 22941 (464), CRN 22945 (564)

Instructor Dr. Laura Cowen, Associate Professor

Welcome! We are fortunate to conduct our class on the traditional territories of the Lekwungen-speaking people, where the Songhees, Esquimalt, and the WSÁNEĆ peoples continue to uphold historical relationships with the land.

I am an ecological statistician in the department of Mathematics and Statistics. I was trained as a field biologist receiving a BSc from Simon Fraser University where I did extensive field research on seabirds in British Columbia and Alaska. From there I saw the light and pursued a Masters degree in biostatistics (Mmath) at the University of Waterloo. Here I worked with an optometrist to define the astigmatism in a pre-school population. Wanting to bridge my passion of biology with my statistical knowledge, I obtained a doctoral degree in statistics studying mark-recapture models. From there I joined the University of Victoria, continuing to work on mark-recaptures models, I collaborate with other researchers to study injection drug users, syphilis, seabirds, rock lobsters, and fish.

I designed this upper level course to provide an overview of computer algorithms and methods used in statistical research. Topics that may be covered are: Best programming practices, Numerical Integration, EM algorithm, Bootstrapping, Optimization, Constrained Optimization, MCMC, and Smoothing. Stat 556 students will be required to research a topic of their choice, write a summary of this topic and teach the topic to the class.

Email lcowen@uvic.ca, email is to be used for administrative purposes only. For all other issues and especially for statistical discussions, please see me in person.

Phone 250-721-6152

Office David Turpin Building A446

Office Hours and Assistance

Tuesday/Wednesday 1:30 pm to 2:30 pm, or by appointment

Course Material and Online Resources

Textbook Givens, G. H. and Hoeting, J. A. 2013. Computational Statistics, 2nd edition. Wiley: New Jersey.

References (on reserve in library)

Weihls, C., Mersmann, O. and Ligges, U. 2014. Foundations of Statistical Algorithms: With References to R Packages. CRC Press: Boca Raton.

Rizzo, M.L. 2007. Statistical Computing with R. Chapman and Hall / CRC The R Series.

Course webpage CourseSpaces STAT 464/564

Calculator The only acceptable calculator is the Sharp Calculator with a model number starting with "EL-510R.

Statistical Software and Computer Labs

Software R, a free statistical software language is used in this course. It is on the computers in the computer labs on campus. R can be downloaded from <http://www.r-project.org/>. We will use R Studio which is a user interface to R, and we will try to introduce R Markdown, a module to write both text and R code for projects and reports. Download both RStudio and the R Markdown library for free.

Evaluation and Grading

Component	464	564	Date
Assignments	30%	20%	Approx biweekly
Term Test	20%	20%	Feb 26
Final exam	50%	50%	TBA
Project	0%	10%	Last 2 weeks of class

Assignments I will give approximately 4 marked homework assignments . If you work together on these assignments, I expect that collaborations are fair in that everyone in a group puts in real effort to do the problems. I forbid straightforward copying. Collaborative work can benefit all participants but 'free-riding' at the expense of others is unethical and ultimately unproductive.

In the interest of being fair to all individuals involved, I do not accept assignments late. The course marker typically picks up all assignments at the same time. This person is a graduate student attempting to manage their own time in terms of research, course work, and marking.

Exams I will deny extension requests for exams. Please turn off all mobile phones, PDAs, and other electronic devices, and store these electronic items, calculator covers, hats, coats, and back-packs at the front of the room during examinations (including the term test). This will allow all of the aisles to be clear of debris so that I can travel easily around the room to answer questions.

Missing work If you miss an assignment or exam due to illness, accident, or family affliction, you should notify me as soon as possible and provide a written request to be excused with supporting documentation within 1 week of your return to class. In such cases I will either set a retest, or your course score will be calculated out of the remaining course components with the final exam being worth no more than %60.

Mark Disputes I will accept reasonable arguments in writing regarding marking disputes for 2 weeks after the item has been handed back. After this time, I will consider the recorded mark as final. I will shred all assignments and term exams that have not been picked up by the final exam.

Policies and Ethics

Classroom conduct I believe my classroom should be a safe, respectful and inclusive environment for all. I will not tolerate violence, disruptive behaviour, or disrespectful comments towards anyone. Please see University Policy AC1300 and the University Calendar for more information on non-academic misconduct.

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 will be converted to letter grades according to the university-wide standard table
(Undergraduate: <http://web.uvic.ca/calendar/undergrad/info/regulations/grading.html#>). (Graduate: <http://web.uvic.ca/calendar/grad/academic-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:
Undergraduate: <http://web.uvic.ca/calendar/undergrad/info/regulations/concessions.html>
Graduate: <http://web.uvic.ca/calendar/grad/registration/concessions.html>

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.

Attendance The university Calendar states 'Students are expected to attend all classes in which they are enrolled.'

Undergraduate: <http://web.uvic.ca/calendar/undergrad/info/regulations/attendance.html>

Graduate: <http://web.uvic.ca/calendar/grad/academic-regulations/attendance.html#>

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.

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.

[State your policy on missing work. For example, how will you accommodate students who miss a midterm due to illness?]

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 students transcript, or a suspension.

It is your responsibility to understand the University's policy on academic integrity:

Undergraduate:

<http://web.uvic.ca/calendar/undergrad/info/regulations/academic-integrity>

Graduate:

<http://web.uvic.ca/calendar/grad/academic-regulations/academic-integrity.html>

Counselling Services If you experience personal difficulties I encourage you to make use of your free access to professional counsellors. They will help you with both personal/family issues as well as academic issues and mental health issues such as anxiety or depression. Go to www.uvic.ca/services/counselling/ for more information.

How to Succeed in This Course

Find a study neighbour, read the chapters before the lecture, do the assigned questions, come to office hours, participate and ask questions during class, watch for new material and course announcements on CourseSpaces. Be curious!

Course Schedule (Dates are approximate)

Week of	Lecture
1 Feb	Class Cancelled
18-22 Feb	Reading Break - No classes
26 Feb	Midterm Exam
28 Feb	Last day for withdrawing from courses without penalty of failure
5 Apr	Last day of classes,
08 Apr	Exam Period Begins Good Friday
22 Apr	Exam Period ends Easter Monday