

Math 410A, Fall 2019
Advanced Statistical Methods (part 1)

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Office Hours: Monday 10–11, Tuesday 10–11, Wednesday 1–2, Thursday 1–2, and by appointment

Meeting times:

Tuesday, Wednesday, 9:00 – 9:50 in Samuelson 251

Monday, Thursday, 9:00 – 9:50 in Samuelson 138 Computer Lab (unless otherwise announced)

Course Goals and Description: This course is the first of a two-part sequence designed to cover the most common statistical methods in use today. We will learn the theory behind the models and methods we use, and we will spend a lot of time using them to answer questions about real-world data. Topics in the first quarter will likely include linear regression, multiple regression, logistic regression, inference from regression, interaction terms, linear discriminant analysis, variable selection methods, and one- and two-way ANOVA.

The second half (410B) will include many details about ANOVA, non-parametric statistics, permutation and bootstrap methods, ridge regression, the lasso, time series analysis, cluster analysis, and Principal Component Analysis. This part of the course will also include a significant component on presenting statistics in public.

Students completing both parts A and B of MATH 410 have seen almost all the material on the Society of Actuaries' *Statistics for Risk Modeling* exam.

Required Text: Gareth James, et al. *An Introduction to Statistical Learning with Applications in R*, Springer.

(Note that this text is freely available for download.)

Evaluation and Grading: Grades will consist of four components: (roughly) weekly labs (20%), homework (10%), two midterm exams (20% each), and a large quarter-long project (30%) in which you will complete and write about a significant statistical analysis of your own or with your team. This may serve as a prelude to a larger project you will complete in Math 410B.

Grades will be assigned according to the following scale:

	A	93-100%	A-	90-92.99%	
B+	87-89.99%	B	83-86.99%	B-	80-82.99%
C+	77-79.99%	C	73-76.99%	C-	70-72.99%
D+	67-69.99%	D	63-66.99%	D-	60-62.99%
	F	59.99% and below			

Details concerning course components

“R skills” labs

The course will feature two or three labs which introduce you to, and let you practice, sets of specific advanced skills in R.

Each of these labs will contain a short introduction, a reference to one or more resources for mastering the technique, and a set of challenges for you to complete.

Homework

A small amount of homework will be assigned from the book most weeks. These are designed to let you practice the basics of the new statistics we are covering, and the corresponding techniques in R. Homework will generally not be collected.

Midterm Exams

There will be two take-home mid-term exams, given roughly during Week 5 and Week 9. During this time you may use any sources you like except for other people.

General Course Policies: Come to class. Do your own work. Work really hard; this class is likely to be quite difficult, but you will leave it with a useful set of skills, and a better understanding of statistics!

Academic Honesty

Consult university policies (CWUP 5-90-040(22), CWUR 2-90-040(22), and WAC 106-125-020) for student conduct, cheating, plagiarism, and other academic expectations. CWU's policies and recommendations for academic misconduct will be followed, leading to disciplinary action up to and including failing the course.

Diversity Statement

As a member of a peer learning community, a high degree of professionalism is necessary. **CWU expects every member of the university community to contribute to an inclusive and respectful classroom culture.**

Disability Support Services

Central Washington University is committed to creating a learning environment that meets the needs of its diverse student body. Students with disabilities should contact Disability Services to discuss a range of options to removing barriers, including accommodations: Hogue Hall 126, 509.963.2214, DS@cwu.edu

Is my absence excused?

Excused absences will not lower your overall grade in this class and are determined on a case-by-case basis. Excused absences include illness, bereavement, and school-related activities. Documentation is required. Excused absences do not include travel for holiday breaks, work, or non-emergency travel delays.

In compliance with RCW 28B.137.010, Central Washington University makes every effort to deal reasonably and fairly with students who, because of religious obligations, have conflicts with scheduled exams, assignments or required attendance. Students must present written notice to their instructor within the first two weeks of class listing the specific dates on which accommodations are required. Contact the Dean of Student Success at (509) 963-1515 for further information or questions.

I reserve the right to change the policies contained in this syllabus as dictated by developments during the quarter.