

PubH 8403-001
Research Skills in Biostatistics
Fall 2017

Credits:	1
Meeting Days:	Wednesday
Meeting Time:	2:30-3:20pm
Meeting Place:	Mayo A-434 (main Biostatistics conference room)
Instructor:	Lynn Eberly, PhD
Office Address:	A-465 Mayo Building, MMC 303, 420 Delaware Street SE, Minneapolis, MN 55455
Office Phone:	612-624-1436
Fax:	612-626-0660
E-mail:	leberly@umn.edu
Office Hours:	TBA

I. Course Description

This course introduces doctoral students in Biostatistics to research skills necessary for writing and defending a dissertation, and more generally for a career in research. Format and course topics will vary from week to week, as described below. Students will be given assignments to reinforce skills presented in class. The class meeting time (immediately before seminars) was chosen to facilitate subsequent seminar attendance, since learning how to both give and listen to scholarly talks is itself a research skill.

II. Course Prerequisites

Stat 8101-02 and admission to the PhD program in Biostatistics. The course is meant to be taken the fall before the PhD written exam is to be attempted, so "Schedule 2" students would typically wait to enroll until their second year in the program.

III. Course Goals and Objectives

Upon successful completion of the course, students will be well-versed in the basic tools needed to transition from a bachelors/Masters mentality (where mere mastery of a variety of coursework is sufficient) to a PhD mentality (where instigation, development, presentation, and publication of original research is required). Skills covered will include CV-writing, mathematical word processing, oral and poster presentation skills, computer systems and efficient and responsible use of high-speed multicore processors, choosing a thesis area and advisor, scientific writing, an introduction to grant writing and research ethics, and a variety of other research survival skills.

IV. Methods of Instruction and Work Expectations

Methods of instruction will be through in-class lectures and presentations, homework assignments, and hands-on practice with the various software packages utilized. Prof. Eberly will typically be assisted in leading the class by one or more guests who will co-lead the day's discussion.

V. Course Text and Readings

There is no required text for the course, but readings and websites will be provided as needed. This will include (but not be limited to) Burton et al. (2006, Statistics in Medicine) on design of simulation studies in medical statistics, Baggerly and Coombes (2009, Annals of Applied Statistics) and two accompanying articles in The Cancer Letter on the reproducible research scandal at Duke University, Gelman et al. (2002, The American Statistician) on graphical displays, and Gould et al. (1999, Biometric Society - ENAR) on preparing effective presentations. Handouts will also be generously provided, including basic information on the R language and how it can be efficiently utilized on the division's multicore machines.

VI. Course Outline/Weekly Schedule

Week	Date	Topic	Faculty and Guests	Assignments
1	6 Sep	Survival tips and strategies for success; introduction to library research resources, tracking research productivity using library tools.	Lynn Eberly; Shanda Hunt , public health specialist at the BioMed Library	Read Burton et al. 2006 StatMed before next week.
2	13 Sep	Designing and implementing simulation studies in R; reproducible research.	Eric Lock, David Vock	Design and implement your own simulation study in R. Due in one week.
3	20 Sep	Using the division's high-performance computers.	Weihua Guan, Tom Murray; Greg Thompson , CCBP computing staff	Read Baggerly and Coombes, July 2010, Ann Appl Stat, and both Goldberg 2010 Cancer Letter articles before next week.
4	27 Sep	Research ethics and responsibility, plagiarism.	Saonli Basu, John Connett	Read the ASA Ethical Guidelines for Statistical Practice before next week.
5	4 Oct	Documenting your statistical work	Ann Brearley	Read Morgenstain Consulting Best Practices before next week.
6	11 Oct	Working with clinical and other non-biostatistical investigators.	Chap Le, Cavan Reilly, Haitao Chu, Erika Helgeson	
7	18 Oct	LaTeX for advanced word processing.	Lynn Eberly	Create your CV in LaTeX. Due in one week.
8	25 Oct	Manuscript submission and review.	Jim Neaton, Wei Pan (Note: Dr. Eberly will be absent this day.)	Read Gelman et al Am Stat 2002 and Gould et al. 1999 from IBS-ENAR before next week.
9	1 Nov	Poster and oral presentation skills; using LaTeX, Beamer, or TexPoint.	Mark Fiecas, Susan Wei	Create a Beamer or TexPoint poster or oral presentation describing your simulation results. Due in one week.

10	8 Nov	Effective scientific writing.	Jim Hodges	
11	15 Nov	Using the university's supercomputing facility: Minnesota Supercomputing Institute (MSI) for Advanced Computational Research.	Baolin Wu, Lin Zhang; James Wilgenbusch, MSI	Implement your simulation study on one of these two computer systems. Due in two weeks.
12	22 Nov	Choosing a dissertation topic and advisor.	Lynn Eberly, Kyle Rudser, Xianghua Luo, Ashley Peterson, Sandra Safo	Read Schwartz J Cell Science 2008 before next week.
13	29 Nov	Scientific writing case study: the dissertation proposal.	Lynn Eberly	
14	6 Dec	Introduction to grant writing.	Lynn Eberly; Beth Virnig, Professor, Senior Associate Dean for Research	Research dissertation support grants; prepare a topic you might choose to write about, and write a few sentences about how you would "sell" it to a grant reviewer, both to an expert in your field (biostatistics/bioinformatics) and more broadly (say, an MD researcher). Due in one week.
15	13 Dec	Effective teaching.	Julian Wolfson, Laura Le, Marta Shore	

VII. Evaluation and Grading

Students will be given assignments to reinforce skills presented in class. The assignments are described briefly in the Weekly Schedule above; more details are in the class Moodle web site. All students must complete all assignments with a grade of S and attend a minimum of 4 divisional seminars in order to earn a grade of "S". If you receive an NS on an assignment, you may revise and resubmit for regrading. Students may provide each other with feedback on some assignments; for example, we will use a version of a rubric originally designed at Iowa State University to help provide constructive criticisms on oral presentations.

As a general rule, **prior notification is essential** to my accepting a late assignment of any kind. If illness or travel is going to cause you to miss a deadline, don't surprise me -- send an e-mail message to me or leave a message at the Biostatistics main office (612-624-4655).

The University utilizes plus and minus grading on a 4.000 cumulative grade point scale in accordance with the following:

- A 4.000 - Represents achievement that is outstanding relative to the level necessary to meet course requirements
- A- 3.667
- B+ 3.333
- B 3.000 - Represents achievement that is significantly above the level necessary to meet course requirements
- B- 2.667

C+	2.333
C	2.000 - Represents achievement that meets the course requirements in every respect
C-	1.667
D+	1.333
D	1.000 - Represents achievement that is worthy of credit even though it fails to meet fully the course requirements
S	Represents achievement that is satisfactory, which is equivalent to a C- or better.

For additional information, please refer to:

<http://policy.umn.edu/Policies/Education/Education/GRADINGTRANSCRIPTS.html>.

Course Evaluation

The SPH will collect student course evaluations electronically using a software system called CourseEval: www.sph.umn.edu/courseeval. The system will send email notifications to students when they can access and complete their course evaluations. Students who complete their course evaluations promptly will be able to access their final grades just as soon as the faculty member renders the grade in SPHGrades: www.sph.umn.edu/grades. All students will have access to their final grades through OneStop two weeks after the last day of the semester regardless of whether they completed their course evaluation or not. Student feedback on course content and faculty teaching skills are an important means for improving our work. Please take the time to complete a course evaluation for each of the courses for which you are registered.

Incomplete Contracts

A grade of incomplete "I" shall be assigned at the discretion of the instructor when, due to extraordinary circumstances (e.g., documented illness or hospitalization, death in family, etc.), the student was prevented from completing the work of the course on time. The assignment of an "I" requires that a contract be initiated and completed by the student before the last official day of class, and signed by both the student and instructor. If an incomplete is deemed appropriate by the instructor, the student in consultation with the instructor, will specify the time and manner in which the student will complete course requirements. Extension for completion of the work will not exceed one year (or earlier if designated by the student's college). For more information and to initiate an incomplete contract, students should go to SPHGrades at: www.sph.umn.edu/grades.

University of Minnesota Uniform Grading and Transcript Policy - A link to the policy can be found at onestop.umn.edu.

VIII. Other Course Information and Policies

Grade Option Change (if applicable)

For full-semester courses, students may change their grade option, if applicable, through the second week of the semester. Grade option change deadlines for other terms (i.e. summer and half-semester courses) can be found at onestop.umn.edu.

Course Withdrawal

Students should refer to the Refund and Drop/Add Deadlines for the particular term at onestop.umn.edu for information and deadlines for withdrawing from a course. As a courtesy, students should notify their instructor and, if applicable, advisor of their intent to withdraw.

Students wishing to withdraw from a course after the noted final deadline for a particular term must contact the School of Public Health Office of Admissions and Student Resources at sph-ssc@umn.edu for further information.

Student Conduct Code

The University seeks an environment that promotes academic achievement and integrity, that is protective of free inquiry, and that serves the educational mission of the University. Similarly, the University seeks a community that is free from violence, threats, and intimidation; that is respectful of the rights, opportunities, and welfare of students, faculty, staff, and guests of the University; and that does not threaten the physical or mental health or safety of members of the University community.

As a student at the University you are expected adhere to Board of Regents Policy: *Student Conduct Code*. To review the Student Conduct Code, please see:

http://regents.umn.edu/sites/default/files/policies/Student_Conduct_Code.pdf.

Note that the conduct code specifically addresses disruptive classroom conduct, which means "engaging in behavior that substantially or repeatedly interrupts either the instructor's ability to teach or student learning. The classroom extends to any setting where a student is engaged in work toward academic credit or satisfaction of program-based requirements or related activities."

Use of Personal Electronic Devices in the Classroom

Using personal electronic devices in the classroom setting can hinder instruction and learning, not only for the student using the device but also for other students in the class. To this end, the University establishes the right of each faculty member to determine if and how personal electronic devices are allowed to be used in the classroom. For complete information, please reference:

<http://policy.umn.edu/Policies/Education/Education/STUDENTRESP.html>.

Scholastic Dishonesty

You are expected to do your own academic work and cite sources as necessary. Failing to do so is scholastic dishonesty. Scholastic dishonesty means plagiarizing; cheating on assignments or examinations; engaging in unauthorized collaboration on academic work; taking, acquiring, or using test materials without faculty permission; submitting false or incomplete records of academic achievement; acting alone or in cooperation with another to falsify records or to obtain dishonestly grades, honors, awards, or professional endorsement; altering, forging, or misusing a University academic record; or fabricating or falsifying data, research procedures, or data analysis. (Student Conduct Code:

http://regents.umn.edu/sites/default/files/policies/Student_Conduct_Code.pdf) If it is determined that a student has cheated, he or she may be given an "F" or an "N" for the course, and may face additional sanctions from the University. For additional information, please see:

<http://policy.umn.edu/Policies/Education/Education/INSTRUCTORRESP.html>.

The Office for Student Conduct and Academic Integrity has compiled a useful list of Frequently Asked Questions pertaining to scholastic dishonesty: <http://www1.umn.edu/oscai/integrity/student/index.html>. If you have additional questions, please clarify with your instructor for the course. Your instructor can respond to your specific questions regarding what would constitute scholastic dishonesty in the context of a particular class-e.g., whether collaboration on assignments is permitted, requirements and methods for citing sources, if electronic aids are permitted or prohibited during an exam.

Makeup Work for Legitimate Absences

Students will not be penalized for absence during the semester due to unavoidable or legitimate circumstances. Such circumstances include verified illness, participation in intercollegiate athletic events, subpoenas, jury duty, military service, bereavement, and religious observances. Such circumstances do not include voting in local, state, or national elections. For complete information, please see:

<http://policy.umn.edu/Policies/Education/Education/MAKEUPWORK.html>.

Appropriate Student Use of Class Notes and Course Materials

Taking notes is a means of recording information but more importantly of personally absorbing and integrating the educational experience. However, broadly disseminating class notes beyond the classroom community or accepting compensation for taking and distributing classroom notes undermines instructor interests in their intellectual work product while not substantially furthering instructor and student interests in effective learning. Such actions violate shared norms and standards of the academic community. For additional information, please see: <http://policy.umn.edu/Policies/Education/Education/STUDENTRESP.html>.

Sexual Harassment

"Sexual harassment" means unwelcome sexual advances, requests for sexual favors, and/or other verbal or physical conduct of a sexual nature. Such conduct has the purpose or effect of unreasonably interfering with an individual's work or academic performance or creating an intimidating, hostile, or offensive working or academic environment in any University activity or program. Such behavior is not acceptable in the University setting. For additional information, please consult Board of Regents Policy: <http://regents.umn.edu/sites/default/files/policies/SexHarassment.pdf>

Equity, Diversity, Equal Opportunity, and Affirmative Action

The University will provide equal access to and opportunity in its programs and facilities, without regard to race, color, creed, religion, national origin, gender, age, marital status, disability, public assistance status, veteran status, sexual orientation, gender identity, or gender expression. For more information, please consult Board of Regents Policy: http://regents.umn.edu/sites/default/files/policies/Equity_Diversity_EO_AA.pdf.

Disability Accommodations:

The University of Minnesota is committed to providing equitable access to learning opportunities for all students. The Disability Resource Center Student Services is the campus office that collaborates with students who have disabilities to provide and/or arrange reasonable accommodations.

If you have, or think you may have, a disability (e.g., mental health, attentional, learning, chronic health, sensory, or physical), please contact DRC at 612-626-1333 or drc@umn.edu to arrange a confidential discussion regarding equitable access and reasonable accommodations.

If you are registered with DRC and have a current letter requesting reasonable accommodations, please contact your instructor as early in the semester as possible to discuss how the accommodations will be applied in the course.

For more information, please see the DRC website, <https://diversity.umn.edu/disability/>.

Mental Health and Stress Management

As a student you may experience a range of issues that can cause barriers to learning, such as strained relationships, increased anxiety, alcohol/drug problems, feeling down, difficulty concentrating and/or lack of motivation. These mental health concerns or stressful events may lead to diminished academic performance and may reduce your ability to participate in daily activities. University of Minnesota services are available to assist you. You can learn more about the broad range of confidential mental health services available on campus via the Student Mental Health Website: <http://www.mentalhealth.umn.edu>.

The Office of Student Affairs at the University of Minnesota:

The Office for Student Affairs provides services, programs, and facilities that advance student success, inspire students to make life-long positive contributions to society, promote an inclusive environment, and enrich the University of Minnesota community.

Units within the Office for Student Affairs include, the Aurora Center for Advocacy & Education, Boynton Health Service, Central Career Initiatives (CCE, CDes, CFANS), Leadership Education and Development – Undergraduate Programs (LEAD-UP), the Office for Fraternity and Sorority Life, the Office for Student Conduct and Academic Integrity, the Office for Student Engagement, the Parent Program, Recreational Sports, Student and Community Relations, the Student Conflict Resolution Center, the Student Parent HELP Center, Student Unions & Activities, University Counseling & Consulting Services, and University Student Legal Service.

For more information, please see the Office of Student Affairs at <http://www.osa.umn.edu/index.html>.

Academic Freedom and Responsibility: *for courses that do not involve students in research*

Academic freedom is a cornerstone of the University. Within the scope and content of the course as defined by the instructor, it includes the freedom to discuss relevant matters in the classroom. Along with this freedom comes responsibility. Students are encouraged to develop the capacity for critical judgment and to engage in a sustained and independent search for truth. Students are free to take reasoned exception to the views offered in any course of study and to reserve judgment about matters of opinion, but they are responsible for learning the content of any course of study for which they are enrolled.*

** Language adapted from the American Association of University Professors "Joint Statement on Rights and Freedoms of Students".*

Student Academic Success Services (SASS): <http://www.sass.umn.edu>:

Students who wish to improve their academic performance may find assistance from Student Academic Support Services. While tutoring and advising are not offered, SASS provides resources such as individual consultations, workshops, and self-help materials.