36-490 Undergraduate Research
Spring 2015

Instructor: Rebecca Nugent
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Office Hours: by appt

<u>**Class Meetings:**</u> Mondays, Wednesdays 10:30-11:50am, WEH 8427

<u>**Website:**</u> `http://www.cmu.edu/blackboard`

<u>**Prerequisites:**</u> 36-401, department permission

<u>**Textbooks:**</u>
We'll have recommended textbooks as needed. You'll receive readings, papers, etc and will likely need to do background reading for your projects. We'll use *Applied Linear Regression Models* by Kutner, et al as a baseline.

<u>**General Course Plan:**</u> The purpose of 36-490 is to train students how to undertake a research project using statistical methodology. Students will learn the basic components of a research problem and will, over the course of the semester, be exposed to the inherent challenges in trying to tackle previously unsolved research problems. Students will also learn how to work with clients and collaborators from other disciplines. Students will also develop a critical eye when reading research papers and be able to briefly characterize and criticize work in the current literature. The primary goal is the completion of a research project for a faculty client (or group of clients); the project will entail understanding the research problem, exploring the previous work/literature, determining appropriate methodology (with adaptions if necessary), presenting results, and summarizing the work's contributions and weaknesses. Prior to the larger research project, the class will, as a group, walk through a structured research problem to learn the framework and necessary tools. The class will then be divided into groups and assigned to a faculty client for the remainder of the semester. Results of the research project will be presented in class and at the Meeting of the Minds.

<u>**Course Objectives:**</u>

1. Understand the general components of a research study

2. "Successfully" undertake a structured research problem

3. Be able to critique research in a constructive manner

4. Generate appropriate summaries: research paper, research presentation, poster

5. Professionally interface with client/collaborators

6. Use standard academic tools in statistics: LaTeX, Powerpoint/Beamer, R, etc

Course Work: Your grade in this course will be determined by assignments for the practice research project and then the final research project. The research project will be gauged by the final report, presentation, and poster, but also by sustained effort/progress throughout the semester. Unlike other courses, the work produced in this course may be very inconsistent. It's possible that you might work several hours one week and make no progress; you might also solve a problem very quickly the next week. Research can be very erratic. The most important thing is to keep making a consistent effort.

Grading policy: In this class, you are encouraged to work with your fellow students, however the work you submit must be your own. Acknowledge any help received on your assignments. Copied work will receive no credit. Late assignments will not be accepted. No grades are dropped. **Please come talk to me if there are difficulties; problems/conflicts must be discussed IN ADVANCE.** Final grades will be computed with roughly the following weights:

Intro Project	.30
Research Project	.50
Report	
Presentation	
Poster	
Effort/Progress	
Interfacing with Client	.20

You have <u>one week</u> from the day an assignment, exam, etc is handed back in class to bring any grading issues, comments, complaints, etc to the attention of the instructor. Please note that if you are absent the day something is handed back, you will not receive an extension unless arrangements have been made in advance with the instructor.

Final letter grades will be determined as usual: [90,100] = A, [80,89] = B, [70,79] = C, [60,69] = D, [< 60] = R. Grades may be curved at the instructor's discretion.

Computing: I would suggest using R for this course, but the language should be decided through discussions with the client. We will use R for the practice research project to start the class. R is available on many campus computers, and you may download a free version from www.r-project.org. You may also use the nearly-identical (but not free) program called S+, available on all campus computers. You can obtain a free temporary version from myandrew. This version is good for 1 year; you can keep renewing the license as long as you are a CMU student.

> *R References:* manuals available on R website;
> http://www.stat.cmu.edu/~rnugent/teaching/introR
> *Introductory Statistics with R*, Peter Dalgaard; Springer-Verlag
> *Modern Applied Statistics with S-Plus* Venables, Ripley; Springer

Laptop Policy: Students are expected to be participating in class; any laptop use during class should pertain directly to the class. Instructor reserves the right to not allow laptop use during class. When the class has a guest speaker, laptops must be turned off and put away.

Cellphones/Pagers, etc: All cellphones, pagers, and anything else that makes noise should either be turned off or silenced during class. Texting is not allowed nor is it acceptable professional behavior.

Communication: Assignments and class information will be posted on Blackboard and class website. Help with using Blackboard is available at www.cmu.edu/blackboard/help/.

Email: Sending email to your professor or faculty clients should be treated as professional communication. Emails should have an appropriate greeting and ending; students should refrain from using any kind of "shortcuts", abbreviations, acronyms, slang, etc. in the email text. Emails not meeting these standards may not be answered.

Interacting with Clients/Behavior in Class: All students are expected to behave professionally at all times. Students should respond to email communication promptly. Any communication should be written in a professional manner. Students should be on time (if not early) for all classes, meetings, etc. If mistakes are made or there is miscommunication, students should apologize and be very clear in asking for next steps, instructions, etc. Students are representatives of the Department of Statistics and should behave accordingly. Have high standards for yourselves.

Academic Integrity: All students are expected to comply with the CMU policy on academic integrity. This policy is online at www.studentaffairs.cmu.edu/acad_integ/acad_int.html

Disability Services: If you have a disability and need special accomodations in this class, please contact the instructor. You may also want to contact the Disability Resources office at 8-2013.

Schedule: We'll often cancel class in favor of you meeting with your faculty clients. Meetings will also be set up between the groups and the professor to ascertain progress and work through current issues with the project. The default is that we are having class; I will email you or make announcements about canceling class. Check your email and stay on top of what's happening.

<div align="center">Important Dates on the Schedule: subject to change</div>

Date	Topic
Mon 3/9 - Fri 3/13	Spring Break
Mon 4/27	In class final project presentations
Wed 4/29	In class final project presentations
Wed 5/6	Meeting of the Minds
Fri 5/8	Final Papers due