

ST 810A, SPRING 2005

PREPARATION FOR STATISTICAL RESEARCH

COURSE DESCRIPTION: This course is meant to give students pursuing a Ph.D. in Statistics an organized introduction to the necessary skills and knowledge for a career in statistical research, starting with the first formal research activity, the dissertation. Course topics and class format (lecture, panel discussion, etc.) will vary from week to week, as described below.

INSTRUCTOR: Marie Davidian, 220F Patterson, davidian@stat.ncsu.edu

CLASS MEETINGS: Tuesday, 4:05–5:35 pm, Patterson 208

CREDIT HOURS: 2.0

GRADING: S/U. To receive an “S” grade, a student must complete all assignments (see below) on time, attend class regularly, and participate actively in class discussions.

COURSE WEB PAGE: <http://www4.stat.ncsu.edu/~davidian/st810a/>. Handouts and other useful information will be available here.

COURSEWORK: Major objectives of the course are to help students develop oral and written communication skills, to familiarize students with research resources and practices common in statistics, and to introduce students to activities that are similar to those that they are likely to encounter in their careers. Accordingly, students will be required to complete several assignments focused on aspects of these goals. See the tentative syllabus below. Late assignments will be accepted only if an extension has been approved by the instructor *in advance*.

Because carrying out these assignments is critical to reinforce the course topics, completion of them is *MANDATORY*, and *NO* “sitting-in” or auditing will be permitted. Students *MUST REGISTER* for the course (for credit) in order to participate.

TENTATIVE SYLLABUS: The topics covered are subject to change, but the course will follow roughly this outline.

- 1/11 Introduction, overview, and expectations. What is statistical research? *Faculty panel:* Drs. Boos and Tsiatis.
- 1/18 Researching a statistical topic. Resources for searching the literature. Identifying “important” papers in a research area. Tracing the influence of a paper over time. *Assignment 1:* Search the literature and identify the 10 “most important” papers in a statistical area. (Due 2/1)
- 1/25 \LaTeX I: Introduction, basic syntax and usage, packages, tables and figures, cross-referencing, etc.
- 2/1 \LaTeX II: Importing graphics, advanced features, resources for creating presentations.
- 2/8 Fields of statistical research and the dissertation. Overview of research areas and the dissertation process discussed by faculty who direct dissertations. *Faculty panel:* Drs. Hughes-Oliver, Stefanski, and Zhang.

- 2/15 Written communication. How to communicate effectively in writing. How to get started. What is important? How to structure and organize an article or report – “telling a story.” Journal articles – what makes a good one.
- 2/22 Introduction to Monte Carlo simulation studies. Purpose and scope of a Monte Carlo simulation. Planning and carrying out a simulation. Presenting the results in tables and figures. Interpreting the results. *Assignment 2*: Write a proposal for a simulation study, including background on the issue being addressed, objectives of the study, methods to be used. (Due 3/15; use L^AT_EX)
- 3/1 Academic publication. Scope and purpose of journals. What goes into a journal article. The editorial and refereeing processes. How to decide upon the appropriate outlet for your work. How to respond to reviews. What to do if your paper is rejected. Resources for submission of journal articles.
- 3/8 SPRING BREAK
- 3/15 Oral communication. How to structure an oral presentation. What to present, what not to present. How to speak effectively. *Assignment 3*: Carry out the proposed simulation study and write a report in the form of a journal article. The report should incorporate the background, objectives, and methods from your proposal, and include the design of the actual study, report of the results, and interpretation and conclusions. (Due 4/19; use L^AT_EX)
- 3/22 NO CLASS (ENAR MEETINGS)
- 3/29 NO CLASS (JAMIE ROBINS DISTINGUISHED LECTURE AT SAMSI)
- 4/5 Positions in industry, government, academia. What academic positions are like – tenure, teaching, grants, survival skills. *Assignment 5*: Prepare a 15 minute presentation of the simulation study, including background, objectives, results, interpretation and conclusion. Presentations will take place on the day of the scheduled exam period for this class.
- 4/12 The Curriculum Vitæ (CV). What to include, what to leave out. Applying for a position – the cover letter. Resources for finding out about available positions. What happens at an interview? *Panel discussion*: Graduate students discuss their experiences (TBA). *Assignment 4*: Write your CV and prepare an application package for two real position announcements of interest to you. (Due 4/29)
- 4/19 The world of grants and contracts. Why grants are important. Funding agencies, types of awards, how applications are judged and funded, examples.
- 4/26 Professional and research ethics. What are the responsibilities of a statistician? What issues arise for statisticians in terms of authorship, peer review, collaboration?
- 5/10 (1:00-4:00 pm, scheduled final exam slot for this class; subject to change) *Assignment 5*: Student presentations