

**PERSPECTIVES ON STATISTICAL PRACTICE AND PEDAGOGY**  
**36-701 FALL 2004**

**Course Leader**

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**Class Meetings:** MW 1:30-2:20, BH 231B

**Course Web Pages:**

- <http://www.stat.cmu.edu/~brian/701> [announcements and general information]
- <http://www.cmu.edu/blackboard/> [pre-class questions and other discussions]

**Course Description:**

This is a course for incoming graduate students in the Department of Statistics.

A general aim of our graduate program is to provide students with adaptability and breadth, together with good communication skills that include an appreciation for the cognitive needs of the learner. Practicing statisticians need to work effectively in teams, across disciplinary boundaries; they not only need to command a wide range of disciplinary techniques, but in addition must have the ability to draw out from a colleague the nature of an applied problem, identify potential paths to progress, and iterate this process effectively to make sure the end result will be useful. We are aware that experts have well-developed abilities to “put themselves in the shoes of” their extra-disciplinary collaborators, who are trying to appreciate the way particular statistical methods can help them; the dialogue advances as the expert understands and instructs. Though this collaborative interaction is different from classroom instruction, some of the expertise is similar. Therefore, to improve cross-disciplinary work, as well as teaching, our program helps students develop their instructional skills and deepen their understanding of the way people learn statistical ideas. This course is one important component.

In fact, the interplay of effective cross-disciplinary work and effective teaching is fundamental to our vision of training statisticians. In cross-disciplinary work, statisticians must translate a research question into well-posed statistical problems (A), solve these problems (B), and translate the results back into a product that is accessible to the relevant scientific community ( $A^{-1}$ ). We refer to this process, which is at the heart of statistical practice, as  $ABA^{-1}$ . We observe that students in basic statistical methods courses are also asked to step through the  $ABA^{-1}$  process (though, of course, at a more elementary level). Thus, in developing instructional skills, students will again focus much of their attention on “ $ABA^{-1}$ ,” and the ways learners grapple with its many sometimes-subtle aspects.

The course has several components: Understanding  $ABA^{-1}$ ; A: Identifying the Problem(s); Effective Instruction: The Needs of Learners;  $A^{-1}$ : Written Communication; and Practice in Instruction.

## Activities

For most class periods we will schedule an outside speaker, usually members of the Statistics Department or the Eberly Teaching Center, to give talks or lead discussions on various important issues in teaching and statistical practice. (It may not seem like these two topics go together but I hope we can show you that they do, as the semester progresses.)

The required work for this course is not severe but it is important:

1. You must be scheduled for at least 5 hours of TA duties, including classroom student contact (e.g. as a lab TA) with undergrads in statistics courses [this is taken care of for you; please let me know if you think you do not have a TA assignment like this, this fall].
2. You must complete two written data analysis reports (one for 36-711 [Statistical Computing] and one for 36-707 [Applied Regression]), and submit rough and final drafts of each report. If you are not registered for these two courses please let me know. The final draft must show that you have attended to the comments, suggestions and other feedback given on your rough draft.
3. You must arrange with Michele DiPietro of the Eberly Teaching Center ([dipietro@stat.cmu.edu](mailto:dipietro@stat.cmu.edu)) to have your classroom work observed by an Eberly staff member, and you must participate in a private debriefing from the classroom observation.
4. You must prepare, and deliver in class, a lecture fragment suitable for an introductory undergraduate statistics course. You must also attend other students' lecture fragments.
5. You must actively participate in the other in-class and class-organized activities, such as demonstrations, tours, panel discussions, lectures, etc. that make up the remainder of this course. From time to time I will also ask you to write brief reports or summaries of some of these activities.

During the first couple of class meetings we will organize the rest of the semester together.

## Evaluation

If you complete all five requirements above successfully, you will end up with an A for the course. If you complete them but not with full effort, you will most likely get a B. If you don't complete all five requirements, you will get an I (incomplete). At the regular review of graduate students at the end of the semester the faculty will discuss how you can make up the incomplete, depending on your TA and course assignment in Spring 2005.

## Objectives

- Learn some approaches to statistics teaching and learning that are motivated by cognitive psychology.
- Learn the  $ABA^{-1}$  metaphor for statistical consulting; learn connections between statistical consulting and statistics teaching.
- Begin to think critically about, and self-monitor, your own teaching, through the practice teaching sessions scheduled for this course, and through feedback from classroom observation by Eberly Center teaching staff.
- Begin to think critically about your approach to statistical consulting and collaboration, through paper writing, participation in panel discussions, etc.
- Learn some aspects of being a successful academic statistician.

## Prerequisites

The course is open to any graduate student in Statistics who is concurrently registered for 36-711 and 36-707 and who has at least a 1/2-time TA assignment involving student contact in the classroom or lab. Others may enroll with my permission.