BUS 715 Course Syllabus

This is the course syllabus for BUS 715, offered by Terry Elrod in the School of Business, University of Alberta, Jan-Apr 2010. The class meets Tuesday afternoons, from 13:00 until 15:50, in room L1-10 of the Humanities Centre, beginning January 5.

Brief course description

This course teaches the principles of experimental design for the study of human behaviour. Experiments may be administered through surveys and on the Internet as well as in laboratory settings. Behavioural texts on experimental design rely heavily on weak between-subjects designs, whereas statistics texts favour engineering applications that are inherently simpler than is the study of human behaviour. After explaining the principles of randomization and standard efficient designs, the course concludes by illustrating how more powerful designs can characterize human learning without confounding it with subjects' naive responses. BUS 715 is integrated and coordinated with BUS 716 - Computer-Based Experiments for Behavioural Research. However, it may be taken separately. Prerequisites: Registration in the Business PhD Program or permission of instructor. Approval of the Business PhD Program Director is also required for non-PhD students.

How course marks will be determined

Course marks will consist of four components. The percentages show the weights that each component will play in determining the final mark.

Course mark component	Weight (%)
Homework assignments (due dates TBA)	40
Final exam (TBA)	30
Project	20
In-class participation	10

I set marks by considering both the student's performance relative to others in the class as well as the performance of the class as a whole. I have taught PhD courses more than a dozen times, so my expectations about student performance are informed.

It may seem that a lot is required for this course. However, the weights still add up to only 100 percent! Past students tell me that the work load for this course is typical for PhD courses. Each course component for student evaluation has its purpose, as explained below.

Homework assignments

There will be five assignments, which is roughly one every other week. They will be described in the previous week's class at the latest. They must be submitted to me by e-mail at Terry.Elrod@UAlberta.ca, no later than 8 am on the Monday before the next class.

These assignments are not intended to be hugely time-consuming. They do keep students involved with the course and also provide me with feedback on how students are doing (and thus on what I might do differently as a teacher, even in the very next class).

Final exam

The final exam will be three hours long. It will be an essay exam, but with a quantitative component. It will address conceptual issues and applications of the methods we have studied to particular research settings. The exam date and time is set by the university. It is tentatively set for 2 pm on Wednesday, April 21, in our ordinary classroom.

I have taught BUS 715 four times before (as MARK 715), and I will provide you with all past exam questions and answers.

I include a final exam in the course for several reasons. It encourages students to obtain a comprehensive understanding of the most important material, it provides me with an assessment of a students understanding unassisted by others, and answering the essay questions is similar to writing the data analysis section of a paper and to the answering of a methodological question on the PhD Comprehensive Exam or in the Oral Dissertation Defence.

The course project

I include a course project for several reasons. It tends to involve students in the course by allowing them to apply what they are learning to a problem they care about. It also assesses the ability to do data analysis in a “real” research setting; that is, when there is plenty of time to think about what needs to be done and how to do it. Finally, course projects teach me about the data analysis problems and needs of my students.

The course project will entail the design of an experiment in detail. I will discuss this in the first class. (The alternative of implementing a sophisticated on-line survey is also possible. See me in person if you might be interested.)

I will be happy to discuss the project with each of student individually. In fact, this is recommended.

In-class participation

Quality in-class participation helps other students and demonstrates an understanding of the subject. This is particularly true in PhD courses such as this one. Never speaking up is not participating, and so is being absent from class more than occasionally. Attending class regularly is very important!

I include in-class participation as part of the course mark in order to encourage PhD students to become active and participatory learners. I am a more effective teacher when students speak up with their questions and viewpoints. I don't mind being challenged or contradicted.

Missed deadlines or exam

Due dates for assignments and the project are known well ahead of time and these course components need not be submitted at the last minute , so I am not sympathetic to late submissions. Only the final exam must be done at a specified time. If you are unable to take the exam due to illness, you do not need to see a doctor to obtain a note confirming this, but you will have to sign an affidavit.

My availability

My office is 3-30H in the School of Business. I am generally there every day, particularly in the afternoons, and will be happy to confer on a drop-in basis whenever possible. This seems to be most convenient for most students. Appointments can be made by e-mail (Terry.Elrod@UAlberta.ca).

Course Web site

A Web site for the course has been set up on uLearn. Students signing on to uLearn at https://ulearn.ualberta.ca/webapps/login (notice the “s” in “https://”) will see that BUS 715 is listed as one of the courses. Auditors of BUS 715 will be added on as “guests” by me, giving them access to this site.

Academic integrity

Work submitted by students must be their own. Submitting what someone else has written down or dictated is not acceptable. However, I encourage students to seek the help of myself and others in understanding concepts or results, and even in discussing approaches to a problem. Getting help with debugging of a (set of) R commands is also fine. That is, students will sometimes find that they are not getting from R what they expect and they don’t understand why. I consider work to be your own, for the purpose of an assignment, if you are able to justify and reproduce the analysis you are submitting.

Required textbook

Our course text will be Design and Analysis of Experiments, by Douglas C. Montgomery, sixth edition, published in 2005 by Wiley, ISBN 0-471-48735-X. This text was used for this course last year, so you may be able to get a copy from a second-year student. The text is available at our university bookstore. It is also available from amazon.ca at http://tinyurl.com/5ecgcc. It is not cheap. At amazon.ca it costs $151.95 new but is available used for about $85. Copies should also be available at the university bookstore.

I recommend you get a copy that you can hang on to. Given you will be spending much of a semester learning what's in a book, it helps to retain it for reference. It makes a superb reference book, at more than 600 pages. The only other course materials will be distributed by me through uLearn at no cost. So this text will be your only expense. I realize it is a major one. I promise you good value.

Recommended book

The best single book to own for the use of R for data analysis is Venables, W. N. and Ripley, B. D., Modern Applied Statistics with S, 4th ed., New York: Springer, 2003, ISBN: 0-387-95457-0. The Web site for this text, and supplemental materials, is available at http://lib.stat.cmu.edu/S/MASS4/. It is available new from amazon.ca for $85.50 (including shipping) or used for about $65. See http://tinyurl.com/59xku7. I have also requested that it be placed on reserve at the Winspear Library for this course. When I took my sabbatical in Australia a few years ago, I took only four books, and this was one of them.

The authors discuss in their book many convenient enhancements they have provided for R, and in fact these are included as part of the base installation of the R software. Do not settle for any earlier edition of the text than the 4th, since they do not discuss use of R.

Required computer software

This course presumes access to a good personal computer on which R 2.9.2 (or a later version) has been installed. (R 2.10.0 is the current version.) Using an earlier version will simply lead to frustration. My first question upon being asked for help with R will be “Are you using version 2.9.2 or later of R?” I won’t waste time trying to get something working in an older version of the software. Also, I urge R users to avoid Beta versions (or “test releases”) of the software. A downloadable file for installing R is to be found at http://probability.ca/cran/bin/windows/base/.

Available for R are hundreds of "packages" developed by the R user community. Many are based on books written by first-rate statisticians. I will presume you have download and install all available packages, because then it is easy to search at once all documentation for all available R packages. However, R together with all its packages requires 600MB of hard disk space.

To install packages in R, you should first set the CRAN mirror site. To set the mirror site, select from the R menu Packages / Set CRAN mirror... and choose Canada (BC). After a few moments, a list of packages will appear. Select all the packages and install.

A closing comment

I care a lot about PhD students and about helping them attain the skills and concepts that will allow them to advance knowledge and to succeed professionally. Teaching a PhD course is challenging but it is also a privilege and a pleasure. Statistical tools help scholars do better science. They are a valuable means to an important end, and I enjoy helping scholars master such tools.