TIME AND PLACE:
Monday, Tuesday and Wednesday from 11:30 -12:20 in 75 SH and
Thursday from 11:30 -12:20 in 346 SH (UNIX Lab)

PREREQUISITES: 22S:120 or equivalent, and knowledge of matrix algebra

INSTRUCTOR: Johannes Ledolter, Dept. of Management Sciences and Dept. of Statistics and
Actuarial Science; S352 PBB; tel.: 335-3814; e-mail: johannes-ledolter@uiowa.edu

OFFICE HOURS: Monday and Wednesday 10:30 - 11:15 in S352 PBB, before and after class,
and by appointment.

TEXTBOOK:
Required: Abraham, Bovas and Ledolter, Johannes: Introduction to Regression Modeling.
Optional: Abraham, Bovas and Ledolter, Johannes: Student Solutions Manual for Introduction

CLASS WEBPAGE: We will use ICON. Registered students should have access.

STATISTICS OFFICE: Chair: Professor Luke Tierney in 241 Schaeffer Hall; tel.: 335-0712

ABOUT THE COURSE:

The main topic of this course is regression analysis, which has to do with fitting equations to
data, as well as accompanying diagnostic methods (that is, seeing if the fitted equations fit well)
and statistical inference (that is, seeing to what extent the fitted equations generalize to the
population from which the data have been collected).

This is an applied statistics course, and some of your work will involve data analysis, computing
and communicating statistical results both orally and in writing. On the other hand, this is a
graduate-level statistics course, and hence we will cover the material in some technical depth.
This will provide the theoretical foundation that is needed for subsequent graduate-level statistics
courses. If you want a less technical course, you should take 22S:152.

We will cover Chapters 1 through 8 of the text, and a few selected topics in Chapters 9 through
12. The textbook is a blend of theory and interesting applications. It explains in detail the theory
behind regression, using results from matrix algebra and adopting a data-driven approach that
also emphasizes regression applications. The book includes several case studies from a wide
range of application areas, and it covers the analysis of observational data as well as of data that
arise from designed experiments. Extra material on basic statistics will be reviewed at the
beginning of the semester, and a supplementary handout will be provided.
GRADING:

Weekly homework assignments (15%), two exams (30% each), and a final project (25%).

COMPUTING:

We will emphasize the use of statistical software in exploring and analyzing data. The primary tools will be R and Minitab. R is a freeware statistical language installed on the lab PC’s and also available for download from http://cran.us.r-project.org/; versions for Windows, Linux, and MacIntosh systems are available. Minitab is a commercial multipurpose statistical software package installed on University of Iowa computers. We may also cover essentials of other commercial statistical software products such as SAS, EXCEL, and SPSS.


HOMEWORK ASSIGNMENTS AND PROJECTS:

One learns statistics and regression modeling best by solving exercises that emphasize theoretical concepts, by analyzing real data sets, and by working on projects that require one to identify a problem of interest and to collect data that are relevant to the problem’s solution. Assignments will emphasize all three components. Homework assignments and the final project are group-based, and should be carried out by study groups. Each member of the group will be awarded the same number of points on the project.

In your project you are expected to apply one or more of the studied statistical or modeling techniques to a real-world problem. The group is responsible for formulating the project, collecting the appropriate data, running the required analyses, and summarizing the findings. The project report should consist of a type-written report of about 15 pages (excluding appendices). Relevant statistical tables and computer output must be put in an appendix. A listing of the raw data, with a summary of data definitions and their sources must be included in the appendix and on a computer disk. The report must start with a one-page executive summary. The write-up should discuss the motivation behind the project, describe the data and the way they were obtained, and discuss the statistical analysis. Furthermore, successful projects should give a discussion of the appropriateness of the analysis and should reveal any possible shortcomings. The findings must be interpreted and the conclusions and implications of your work must be clearly spelled out.

PROJECT SUGGESTIONS AND DATA SOURCES:

Quality improvement issues within your company: How can departments and colleges improve their services to students? How can statistics help? Personal quality checklists as an aid to self-improvement.
Surveys and analysis of questionnaires: Relationships between preferences (such as listening or buying preferences) and demographic characteristics (such as gender, occupation, etc).

Study of relationships and associations: Relationship between compensation and performance.

Relationship between professor salaries and performance.

Sales forecasts.

Data may be obtained from Internet sources or from several widely available statistical reference books. The Statistical Data Abstract of the United States (U.S. Bureau of the Census, U.S. Government Printing Office, Washington D.C., 1879 to date) is an annual compendium of summary statistics on the political, social, industrial, and economic life of the United States. Four major monthly governmental periodicals provide the majority of the current statistics available on the economy and its operation. The Survey of Current Business contains about 2500 statistical series on income, expenditures, production, and prices of commodities. Historical figures for the statistical data published in the Survey of Current Business are available in a supplement entitled Business Statistics, published in odd-numbered years. A second source is the Federal Reserve Bulletin which publishes data with emphasis on financial statistics. The third major governmental publication is the Monthly Labor Review which publishes data on work and labor conditions, wage rates, consumer price indices and the like. The fourth is the Business Conditions Digest, which contains several hundred economic time series in a form convenient for forecasters and business analysts.

LATE WORK AND ABSENCES:

Barring illness and family emergencies, late work is not accepted. If you have to miss a class, try to obtain notes from other students. Most handouts and some of the lecture notes will be available on the web.

STUDENT RIGHTS AND RESPONSIBILITIES:

The College of Liberal Arts and Sciences has established policies and procedures regarding plagiarism, cheating, complaints about faculty, and so forth, and those policies will be followed in this course. For details, see http://www.clas.uiowa.edu/students/academic_handbook/ix.shtml.

SPECIAL NEEDS:

I would like to hear from anyone who has a disability which may require some modification of seating, testing or other class requirements so that appropriate arrangements may be made. Please see me after class or contact me by phone or e-mail.

TUTORS: A list of independent tutors can be found at http://www.stat.uiowa.edu/courses/tutors.html