STAT 450 - CASE STUDIES IN STATISTICS
2011-2012

Term 2, T & Th 9:30-10:50, MATH 105 **Instructor: John Petkau, LSK 328**

Calendar Description: Readings and projects in areas of current statistical application including environmental science, industrial statistics, official statistics, actuarial statistics, and medical statistics. **Prerequisite:** STAT 306. [3-0-1]

Objectives: To train students to apply their statistical knowledge to applied research problems, to develop skills of working with non-statisticians either as a consultant or as a collaborator, and to communicate effectively, both orally and in writing, with statisticians and non-statisticians.

Most course activities will be organized around a series of case studies based on recent and current applied research problems from different subject-areas. Students will participate in:

- formulation of statistical approaches to these applied research problems,
- written and oral presentations of proposed statistical approaches,
- data exploration, model building and statistical inference,
- written and oral presentations of results of analyses,
- critical and interactive discussion of all aspects of the case study.

Methodological topics that arise in the case studies will be discussed as necessary.

Students will work in teams. Each student will make oral presentations of their team's work throughout the term and the teams will submit written reports of their work. The main goals of the course are to enhance students' skills for critically appraising study designs and data, for identifying appropriate choices of statistical methodologies, for developing statistical approaches to applied research problems, and for effective communication of approaches and findings.

Strongly Recommended Reference:

B.S. Everitt and T. Hothorn (2010). *A Handbook of Statistical Analyses Using R, 2nd edition,* Chapman & Hall.

Other References:

C. Chatfield (1995). *Problem Solving: A Statistician's Guide, 2nd edition,* Chapman & Hall.

M.J. Crawley (2007). *The R Book,* Wiley.

P. Dalgaard (2008). *Introductory Statistics with R, 2nd edition,* Springer.

N. Lange, L. Ryan, L. Billard, D. Brillinger, L. Conquest and J. Greenhouse (1994). *Case Studies in Biometry*, Wiley.

J. Maindonald and W.J. Braun (2010). *Data Analysis and Graphics Using R, 3rd editon.* Cambridge.

D. Nolan and T. Speed (2000). *Stat Labs: Mathematical Statistics Through Applications,* Springer.

R. Peck, L.D. Haugh and A. Goodman (1998). *Statistical Case Studies: A Collaboration Between Academe and Industry,* SIAM.

P. Spector (1994). *An Introduction to S and S-Plus,* Duxbury.

J.D. Spurrier (2000). *The Practice of Statistics: Putting the Pieces Together,* Duxbury.

W.N. Venables and B.D. Ripley (2002). *Modern Applied Statistics with S, 4th edition,* Springer.