STAT 7140: Linear Models, Fall 2013

Instructor Dr. Liqun Wang
Office: 332 Machray Hall; Phone: 204-474-6270
Email: liqun.wang@umanitoba.ca

Lectures Monday/Wednesday: 10:30am - 11:45am, room 316 MH

Office hours Monday/Wednesday: 2:30pm - 3:30pm

Marking scheme The final grade will consist of two tests and one final exam. Their weights and tentative schedules are given below. The tests will be written during the class.

Test #1	25%	October 7, 2013
Test #2	25%	November 4, 2013
Final Exam	50%	Scheduled by university

Homework There will be no formal assignments. Supplementary problems will be given in the class but they are not to be handed in for credits.

References AC Rencher, GB Schaalje: *Linear Models in Statistics*, 2nd ed, Wiley, 2008.
KE Muller, PW Stewart: *Linear Model Theory*, Wiley, 2006.

RH Myers, JS Milton: *A First Course in the Theory of Linear Statistical Models*, PWS-KENT, 1991.

CE McCulloch, SR Searle, JM Neuhaus: *Generalized, Linear, and Mixed Models*, 2nd ed, Wiley, 2008.

Course content:

1. Matrix algebra: orthogonal matrices, symmetric matrices, spectral decomposition, idempotent matrices, generalized inverse
2. Random vectors and quadratic forms: multivariate normal distribution, linear transform, quadratic forms and their distributions
3. Estimation in full-rank model: fixed and random design models, least squares estimation, Gauss-Markov theorem, maximum likelihood estimation
4. Inference in full-rank model: confidence intervals, hypothesis tests.
5. Estimation in reduced-rank model: ANOVA models, estimable functions, estimation
6. Inference in reduced-rank model: confidence intervals and hypothesis tests
7. Mixed models: restricted maximum likelihood estimation, generalized estimating equations, prediction of random effects.

Academic Dishonesty: I wish to draw your attention to the sections in *The University of Manitoba Undergraduate Calendar* dealing with academic integrity, including plagiarism, cheating and examination impersonation.