GRSC6042 Intermediate Quantitative Research Methods

Content:
The course will cover the following topics:

- Identifying relationships between variables - graphical tools such as scatterplots; measuring association of variables using correlation coefficient;
- Simple linear regression - concept of a regression model; estimating a simple linear regression model; inference and prediction on a simple linear regression model and their interpretation;
- Multiple regression - inference and prediction; model and variable selection; regression diagnostics;
- Analysis of variance (ANOVA) - including multiple comparisons; contrasts;
- General linear model to combine regression and ANOVA;
- Generalized linear models, including Logistic and Poisson regression;
- Experimental designs - simple techniques, such as randomization, blocking and factorial designs;
- Time series - basic concepts of time series including autocorrelation, moving average, seasonality, and trends

Organization:
The course comprises a total of twelve hours over four weekly sessions.

Prerequisite:
This course is designed for students who are familiar with basic statistical concepts.

Enrolment:
Students can take this course or GRSC6034/6035/6036/6037/6007 to fulfil the research methods course requirement of the Graduate School. Students will be asked to provide documentary evidence of having taken a basic statistics course equivalent to GRSC6034/6035. Priority will be given to those who take GS’ research methods course for the first time.

Assessment:
Pass/Fail: Continuous assessment

Learning Outcomes:
At the end of the course, students should understand intermediate level quantitative research and be able to critically review the statistical analysis in most research papers. Specific learning outcomes are to understand:

- Statistical models for multiple continuous variables (multiple regression)
- How to model the effect of categorical and continuous variables on a continuous variable (ANOVA, general linear model)
- How to identify the best model and apply diagnostic checks
- How to design an experiment
- How to handle residuals that are correlated over time (time series)
- How to model when the dependent variable follows a Poisson, Binomial or Exponential distribution (generalized linear model)

August 2, 2018