

GRSC6042 Intermediate Quantitative Research Methods

Aim:

The aim of the course is to enable students to acquire intermediate level quantitative research methodology and be able to critically review the statistical analysis in most research papers.

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. Students will be asked to provide documentary evidence of having taken a basic statistics course equivalent to GRSC6034/6035.

Enrolment:

Students can take this course or GRSC6034/6035/6036/6037/6007 to fulfil the research methods course requirement of the Graduate School. Priority will be given to those who take GS' research methods course for the first time.

Assessment:

Pass/Fail: Continuous assessment of weekly assignments

Learning Outcomes:

On completion of the course, students will be able 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)