STAT 406/EESC 502 Course Outline

Winter Term 1 2017

Instructor: J. Loeppky, Ph.D., P.Stat.
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Lectures: Monday, Wednesday, Friday (10:30 - 11:30 in ART 108)
Office Hours: Monday 14:00-16:00

Calendar Description: Foundation of the use of statistical concepts and methods in environmental science and management. Scientific problem-solving using statistical methods. Integration of the formulation of objectives, study design, and quantitative methods appropriate for the design. The role and use of statistical software packages.

Textbook: Lecture notes will be provided through the course of term. However lecture notes will be inherently incomplete and attending lectures will be essential.

Software: R Studio
Homepage: https://www.rstudio.com
Download page: https://www.rstudio.com/products/rstudio/download/

Website: Course Material can be found on Blackboard Connect: elearning.ubc.ca/connect

Evaluation:

Final Exam	30%
Assignments	20%
Midterm	20%
Project	30%

- You must pass the final in order to pass the course.
- No arrangements can be made to take the midterm at alternative times.

Examinations: Examinations will not test your ability to re-produce a formula or re-produce things that are done in class (including R code). Eaminations will be designed to make you think critically about appropriate modelling choices for data and interpret/critique the results of an analysis. Question in this regard may be a blend of multiple choice, true false, explain what is right or wrong with an analysis or written responses explaining results. Examinations will be open book so that you can double check code. However, if you are checking every piece of code you will run out of time.

Assignments: Assignments will be given out periodically to ensure that students are staying on top of the material. Assignments will not be weighted equally.

Project: Your final project can be an analysis of a problem relevant to biology or environmental science, a theoretical derivation of a method we have used in class or the development of a R Shiny App to illustrate a concept taught in class. Initial data and problem description due at the end of September. Preliminary plan for data analysis is due at the start of November. Graduate student presentation will be in the last week of class.

Term Tests: There will be one in class midterm on October 20, 2017.

Email: I check email twice a day, once in the morning and once in the late afternoon. Emails will be answered in order of importance and when they were received. Always best to talk to me before or after class.

Course Schedule:

Rough list of topics and basic ordering. Coverage of material will be time dependent.

- Review of Statistical principals
  - Hypothesis testing
  - Confidence intervals
  - Types of data
  - Use of R Studio
- Data collection and Working Examples
  - observational studies
  - designed experiments
  - randomization restrictions
  - lack of independence
  - nested error structures
- Regression model
  - Simple regression
  - prediction and error propagation
  - multiple regression
  - diagnostics
  - variable selection

- Modelling of messy data
  - randomization restrictions
  - lack of independence
  - fixed and random effects
  - nested error structures
- Non-normal responses
  - logistic regression
  - LD50/ED50
  - poisson errors
- Multivariate methods
  - principal components
  - clustering
- Dependent error
  - time dependent error sources
  - spatially dependent errors

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Disability Assistance – If you require disability-related accommodations to meet the course objectives, please contact the Diversity Advisor of Disability Resources located in the University Centre, Room 227. For more information about Disability Resources or academic accommodations, please visit the website at: http://www.ubc.ca/okanagan/students/drc/welcome.html.

Equity, Human Rights, Discrimination and Harassment – UBC Okanagan is a place where every student, staff and faculty member should be able to study and work in an environment that is free from human rights based discrimination and harassment. If you require assistance related to an issue of equity, discrimination or harassment, please contact the Equity Office, your administrative head of unit, and/or your unit's equity representative.

UBC Okanagan Equity Advisor: ph. 250-807-9291; email equity.ubco@ubc.ca
Web: www.ubc.ca/okanagan/equity
Unit Equity Representatives: http://www.ubc.ca/okanagan/equity/programs/equityreps/unitcontacts.htm