

Course Instructor	Dr. Laura Thomson	Email: L.Thomson@queensu.ca
Office	MC D128	Tel: 613-533-6000 ext. 75913
Contact Time	Tuesdays from 2:30-5:20 pm - Lecture/seminar, in-class exercises, equipment testing Two field excursions to the Queen's University Biological Station (QUBS), dates TBA.	
Format	Lectures, practice with climate instruments, and introduction to data analysis using 'R'	
Class Assessment	Participation (20%): In-class seminars & exercises, instrument testing, field activities Exercises (55%): Data exploration (10%); Regression (15%); Model evaluation (15%); Time-series (15%) Final Exam (25%): Take-home, 2-weeks to complete	

COURSE OVERVIEW

This course aims to provide students an overview of climate system processes, with a focus on:

1. Designing and deploying systems for the in-situ measurement of key climate variables; and
2. The exploration, analysis, and interpretation of climate data using 'R' programming.

Lectures and seminar discussions will cover the foundational concepts of climate science (energy balance, global circulation) and the approaches to measuring key climate variables including temperature & radiation, pressure & wind, humidity & precipitation, and ground temperature & soil moisture. Students will gain hands-on experience with automatic weather station systems and will be responsible for the design, programming, and deployment of an automatic weather station at the Queen's University Biological Station (QUBS). To analyze and interpret these data, students will develop and apply their statistical analysis abilities in 'R', an open-source programming language with strengths in statistical analysis, plotting, and interactive data visualization. Students are asked to consider how climate data may be incorporated in their individual thesis project, and are encouraged to work with data derived from climate stations near their own research sites.

*Use of the QUBS facilities (meals accommodation) and transportation will require a fee of ~\$100-\$200.

LEARNING OUTCOMES

Upon successful completion of this course students will be able to:

1. Describe fundamental concepts and processes relating to the climate system
2. Identify and deploy instrumentation required to assess key climate variables
3. Employ 'R' programming techniques to critically explore, analyze, and interpret climate data series

COURSE TOPICS

Climatology; Data analysis (quantitative)

COURSE READINGS

Provided in-class.

SOFTWARE/COMPUTING REQUIREMENTS:

Students will need to install and use R and RStudio for this course. Coding experience is an asset, but not required!