

Course Instructor	Dr. Melissa Lafreniere	Email: Melissa.lafreniere@queensu.ca
Office	D124 Macintosh-Corry Hall	
Contact Time	3 hours every 2 weeks	Phone: 533-6000 ext 78720
Format	Lectures, laboratory and field assignments	
Class Assessment	Quizzes	30%
	Laboratory and Field Assignments	40%
	Final Exam	30%

COURSE OVERVIEW

This course examines the basic physical processes that govern the supply and movement of surface waters. Students will develop a thorough understanding of how surface water conditions (snow, rain, soil pore waters, groundwater, and surface runoff) vary with space and time, and how these hydrological reservoirs are influenced by the climatic regimes, soils, and lithology. The course examines how hydrological processes are investigated and quantified, using the watershed as the basic unit for understanding these processes. The course begins with an examination of atmospheric water (precipitation and evaporation) and the generation and flow of surface waters within the watershed. Students in the course then explore the movement of water in soils and groundwater, and through this learn how the climatic, geological and biological properties of the near surface regulate weathering and surface water movement. Practical written assignments focus on hydrological measurements and hydrological data analysis and problem solving. Field and laboratory exercises emphasise hydrological monitoring techniques and methods used to quantify and model the movement of water to and within watersheds.

LEARNING OUTCOMES

- Understand the physical processes that govern the movement of surface water within a watershed, and the temporal and spatial variability of these processes
- Apply methods used to measure inputs and outputs of water in physical hydrological investigations
- Explore and apply analytical and data handling techniques used to understand the water balance, and transfer of water within watersheds.

COURSE TOPICS

- 1) Principles and Processes in Hydrology
- 2) Precipitation
- 3) Snow and snowmelt
- 4) Evaporation and Evapotranspiration
- 5) Infiltration, percolation and flow in the unsaturated zone
- 6) Groundwater flow
- 7) Runoff Generation
- 8) Stream flow and Hydrograph Analysis

COURSE READINGS

Dingman, 2015 Physical Hydrology, Third Edition, Waveland Press, 643p.
Selected readings may also be provided via the course web page.