

ESCI 366

Hydrology

Instructor: Matthew (Matt) Schumacher, PSC 2035, 867-5184, mschumac@stfx.ca

Office Hours: Tuesdays (9am-11pm); Fridays (10am-12pm); or by appointment

Lectures: NH 161; C-block (Monday 10:15; Wednesday 9:15; Friday 8:15)

Labs: Thursdays 2:15 (TBA)

Introduction

The objective of this course is to introduce students to the science of hydrology through an examination of terrestrial water budgets, with an emphasis on examining processes at the catchment scale. In this course we will examine atmospheric processes affecting water transport to terrestrial surfaces, how vegetation affects water flow, how water moves through soil and the subsurface, runoff generation processes and hydrographs, and the use of chemical and isotopic tracers to identify water flow pathways.

Text and Readings

Chapters from various texts may be assigned in class and made available. The following text is required:

Ward, R.C. and M. Robinson, Principles of Hydrology © 2000, McGraw-Hill.

Journal articles relating to topics covered in the lectures will be assigned for reading and discussion in class. Students are responsible for reading these articles and attending these classes.

Topics will include:

I Global Hydrological Cycle

- introduction and overview

II Precipitation

- measurement
- point data extrapolation
- data corrections

III Interception

- patterns
- measurement
- effects of landuse changes

IV Evaporation and Evapotranspiration

- free water E
- ET from terrestrial surfaces
- measurements of E and ET

V Soil Water and Groundwater

- storage and porosity
- flow
- distribution

VI Runoff and Streamflow

- stormflow generation
- annual and flood hydrographs

- floods
- VII Chemical and Isotopic Tracers in Hydrology
- storm hydrograph separation using ^{18}O and D; end member mixing analyses using non-isotopic tracers)

Lab Exercises:

Lab exercises are designed to increase your understanding of hydrological processes and dealing with hydrological data. Students are expected to incorporate background information about assigned topics obtained from readings on the subject into lab reports. Web-based articles and materials that are not obtained from peer reviewed journals or books will not be considered acceptable sources of information. Students must rely upon texts and reviewed journal articles obtained through the library resources. Students are expected to have a basic working knowledge of Excel. Lab reports must follow the formal written structure outlined in class.

Reading Assignment:

Students will complete a reading assignment involving a brief review of a specific topic or journal article in the field of hydrology, assigned by the course instructor.

*All laboratory and other assignments are expected to be handed in on the scheduled due dates. There will be a penalty of 10% per day for any late assignments. **All work must be original and independent.** Academic dishonesty including copying directly from articles and texts and the work of other students will not be tolerated and will be reported to the Departmental Chair and the Dean of Science. Students must hand lab reports directly to the Professor or Laboratory Instructor for the course.*

Grading:

Mid-term exam: 20%
Final exam: 40%
Lab Assignments: 30%
Reading Assignment: 10%