

M: Course Objectives / Learning Outcomes

At the conclusion of the course the successful student will be able to:

1. Describe and explain the hydrologic cycle and the variety of processes involved within it.
2. Describe and use maps and air photographs to identify and illustrate the variety of landforms involved in the terrestrial stage of the hydrologic cycle.
3. Be able to utilize, through lab and field work, routine methods for measuring hydrologic flow and storage.
4. Have used, through map and field work, some methods of analyzing hydrological data.
5. Describe the extent of Canada's water resources.
6. Evaluate the human impact on stream systems and implications for water resource management.

N: Course Content

1. Introduction
 - definition and scope of hydrology
 - physical and chemical properties of water
2. The hydrologic cycle
 - movement through various earth systems
 - phase changes and physical processes
3. Global and regional water balances
 - mass and energy balance equations
4. Precipitation
 - mechanisms
 - spatial variability
 - temporal variability
 - measurement
 - precipitation data analysis
5. Interception and infiltration
 - definitions
 - measurement
 - effect of vegetation
 - Horton's model
6. Evaporation, evapotranspiration
 - estimation and measurement
 - spatial variability
 - atmospheric and surface controls
 - potential and actual evaporation
7. Snow and ice
 - snowpack properties
 - distribution
 - measurement
 - snow melt processes
8. Soil moisture
 - measurement
 - relevant physical properties of soil
 - water storage and movement
 - measurement

Course Content cont'd.

9. Groundwater

- confined and unconfined aquifers
- storage
- movement
- Darcy's law

10. Run off

- stream flow
- basins
- watershed models

11. Surface water storage

- lakes and depressions

12. Inventory of Canadian water resources

- effects of climate change

13. Water quality and water management

- properties of water
- characteristics of water quality
- natural and anthropogenic processes affecting water quality
- urban hydrology

O: Methods of Instruction

The course will employ a variety of instructional methods to accomplish its objectives, including some of the following: lecture, labs, field work, analysis and interpretation of hydrologic data, slides, videos, individual and/or team projects and small group discussions. Readings will be assigned to supplement the text book and the lectures.

P: Textbooks and Materials to be Purchased by Students

Dingman, S.L. (2002) *Physical Hydrology* (2nd ed.). New Jersey: Prentice Hall.

Viessman, W. and Lewis, G.L. (2003) *Introduction to Hydrology* (5th ed.). New York: Harper Collins.

Ward, R.C. and Robinson, M. (2000) *Principles of Hydrology* (4th ed.). London: McGraw Hill.

Q: Means of Assessment

The evaluation will be based on course objectives and will be carried out in accordance with Douglas College policy. The instructor will provide a written course outline with specific evaluation criteria during the first week of classes.

Evaluation will include some of the following:

- Laboratory assignments with a combined value of up to 50%.
- Multiple choice and short answer exams with a combined value of up to 50%.
- Field work with a value of up to 25%.
- A term project with a value of up to 25%.

An example of a possible evaluation scheme would be:

Laboratory Assignments	30%
Midterm Examination	25%
Final Examination	25%
Term Project	<u>20%</u>
	100%

R: Prior Learning Assessment and Recognition: specify whether course is open for PLAR

No.

Course Designer(s): Kathryn Runnalls

Education Council / Curriculum Committee Representative

Dean / Director

Registrar