**CIV E 321 SYLLABUS**

COURSE NAME: Principles of Environmental Modeling & Risk- CIV E 321  
DETAILS: 3 hour lectures, 3/2 hour Lab sections  
TERM: Winter

COURSE DESCRIPTION

\*3.8 (fi 8) (either term, 3-0-3/2) Introduction modeling environmental processes to predict the movement of

water and fate of contaminants in the hydrologic cycle. Principles of mass transfer, conservation of mass,

environmental transformations, nutrient enrichment and depletion are developed. Introduction to storm

events, rainfall, runoff, stream discharge and stormwater management. Applications of modeling results to

the quantification of risk using examples from hydrology, water pollution and health protection and

development of environmental regulations.

REQUIRED MATERIAL

Course Textbooks:

(1) Custom version (selected chapters) of Introduction to Environmental Engineering and Science, 3rd Edition, Gilbert M. Masters and Wendell P. Ela, Prentice Hall, 2008 (REQUIRED). Available at U of Alberta Bookstore

(2) Course pack materials (selected chapters) of Barry, R., and Gan, T. Y., 2011, Global Cryosphere, Past, Present and Future, Cambridge University Press, ISBN:9780521156851 (REQUIRED). Available at Civil Engineering Club.

LECTURE CONTENT

Course outline:

Topics

(1) Introduction – World’s water resources, History of Hydrology, Hydrologic Cycle, environmental issue

(2) Climate, Meteorology and Precipitation

(3) Evapotranspiration

(4) Infiltration & Soil Moisture

(5) Runoff Hydrograph

(6) Water Pollution, Water Quality and Groundwater (Chapter 2, Masters & Wendell, 2008)

(7) Cryosphere and Snow Hydrology (Chapter 2, Barry & Gan, 2011)

(8) Global atmospheric Change (Chapter 10, Barry & Gan, 2011)

LAB CONTENT

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| **Lab Topic** | **Date** |
| Lab 1: Basin-scale precipitation (date is for H2 - H1 is generally 1 wk later) | 2020-01-17 |
| Lab 2: Evaporation & Infiltration | 2020-01-31 |
| Lab 3: Water quality modeling | 2020-03-06 |
| Lab 4: Snow & global warming | 2020-03-27 |