ORIGINAL COURSE IMPLEMENTATION DATE: April 2008
REVISED COURSE IMPLEMENTATION DATE: September 2022
COURSE TO BE REVIEWED (six years after UEC approval)**:** January 2028
Course outline form version: 09/08/2021

OFFICIAL UNDERGRADUATE COURSE OUTLINE FORM

Note: The University reserves the right to amend course outlines as needed without notice.

Course Code and Number: GEOG 303	**Number of Credits:** 4 Course credit policy (105)
Course Full Title: Environmental Hydrology **Course Short Title:**	
Faculty: Faculty of Science	**Department:** School of Land Use and Environmental Change

Calendar Description:

Investigates hydrological processes, the impact of climate change on the hydrological cycle, water resource management, and concerns of water quality. The impact of human use on the hydrology of a region will be addressed.

Note: Field trips outside of class time will be required. Please refer to the department website for scheduling information.

Prerequisites (or NONE):	One of the following: GEOG 201, GEOG 202, GEOG 219/BIO 219.
Corequisites (if applicable, or NONE):	
Pre/corequisites (if applicable, or NONE):	

Antirequisite Courses *(Cannot be taken for additional credit.)*

Former course code/number:

Cross-listed with:

Equivalent course(s):

(If offered in the previous five years, antirequisite course(s) will be included in the calendar description as a note that students with credit for the antirequisite course(s) cannot take this course for further credit.)

Typical Structure of Instructional Hours

Lecture/seminar	25
Supervised laboratory hours (science lab)	35
Experiential (field trip)	30
Total hours	**90**

Scheduled Laboratory Hours

Labs to be scheduled independent of lecture hours: ☒ No ☐ Yes

Course Details

Special Topics course: **No**
(If yes, the course will be offered under different letter designations representing different topics.)

Directed Study course: **No**
(See policy 207 for more information.)

Grading System: **Letter grades**

Delivery Mode: **May be offered in multiple delivery modes**

Expected frequency: **Every three years**

Maximum enrolment (for information only)**: 25**

Prior Learning Assessment and Recognition (PLAR)

PLAR is available for this course.

Transfer Credit *(See **bctransferguide.ca**.)*

Transfer credit already exists: **No**

Submit outline for (re)articulation: **Yes**
(If yes, fill in transfer credit form.)

Department approval	**Date approved:**	November 2021
Faculty Council approval	**Date approved:**	December 3, 2021
Undergraduate Education Committee (UEC) approval	**Date of meeting:**	January 28, 2022

Learning Outcomes *(These should contribute to students' ability to meet program outcomes and thus Institutional Learning Outcomes.)*

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

1. Articulate the processes involved in the hydrologic cycle.
2. Apply hydrologic principles to explain the hydrology of a specific environment, both qualitatively and quantitatively.
3. Predict the response of a specific hydrologic environment to climate change.
4. Apply physical and human geographic perspectives to address complex hydrologic and environmental issues.
5. Apply appropriate geographic skills and techniques (data collection and analysis, mapping, GIS, etc) to solve real-world problems.
6. Discuss Indigenous perspectives of the water and land.
7. Critically reflect upon their learning from group interactions, in-class discussions, field work and related research.

Recommended Evaluation Methods and Weighting *(Evaluation should align to learning outcomes.)*

Quizzes/tests:	25%	Portfolio:	10%	Project:	20%
Assignments:	25%	Lab work:	20%		%

Details:

Instructional methods include lectures and/or problem-based learning strategies, laboratory (or data collection/analysis) activities, self-directed learning, and field trips.

NOTE: The following sections may vary by instructor. Please see course syllabus available from the instructor.

Texts and Resource Materials *(Include online resources and Indigenous knowledge sources. Open Educational Resources (OER) should be included whenever possible. If more space is required, use the Supplemental Texts and Resource Materials form.)*

	Type	Author or description	Title and publication/access details	Year
1.	Textbook	Davie, T. Davie, T.	Fundamentals of Hydrology (2nd edition or most recent)	2008
2.	Textbook	Han, D.	Concise Hydrology	2010
3.	Textbook	Arnell, N.	Hydrology and Global Environmental Change	2001
4.	Textbook	Ward, AD, Trimble, SW, Burckhard, SR and Lyon, JG	Environmental Hydrology (3rd Edition)	2015
5.				

Required Additional Supplies and Materials *(Software, hardware, tools, specialized clothing, etc.)*

There may be a fee for field trip transportation and accommodation costs, if applicable.

Course Content and Topics

Traditional course delivery:
The course may be offered using a traditional delivery method that uses lectures, lab exercises, discussion of journal articles, and field trips. Course breakdown is as follows:
Week 1 – Course introduction
Week 2 – The Hydrologic Cycle
Week 3 – Precipitation
Week 4 – Evaporation
Week 5 – Storage
Week 6 – Run-off
Week 7 – Streamflow analysis and modelling
Week 8 – The Unit hydrograph
Week 9 – Water quality
Week 10 – Water resource management
Week 11 – Climate change and the hydrological cycle
Week 12 – Student presentations and posters
Week 13 – Student presentations and posters

Lab exercises will be in the format of primary data collection and analysis activities. These activities will be assessed as formal lab exercises/reports. Students will be involved in all aspects of the data collection and analysis process. The lab content for the course is as follows:

1. Project design (Week 1)
2. Project implementation (Week 2)
3. Data collection (Weeks 3-8) – students will be collecting data on precipitation, evaporation, run-off, soil moisture, temperature, humidity, and other parameters as appropriate
4. Data analysis (Weeks 4-10) – analysis of the collected data will occur in conjunction with continued data collection activities and be completed following collection period

Course delivered using PBL:
This course may also be offered using a modified problem-based learning strategy and as such much of the learning and content of the course will be largely determined by the students. Students will be introduced to a real-world problem at the beginning of the course and will then be responsible for determining the strategies and content required to meet the course learning outcomes while answering the posed question. Depending on the problem, fieldtrips to the study site will be arranged. Short mini lessons on key topics will be given by the instructor to guide the students' learning with the remainder of the content resulting from student investigation of the topic. The instructor will facilitate the learning environment and provide key direction, mini lessons, and background information. The content covered will mirror that covered in a traditional course model but organization will be somewhat fluid and a weekly breakdown is not possible (due to the PBL delivery mode). Topics to be covered (although not in necessarily in this order):

- Properties of water
- The hydrological cycle
- Water balance
- Watershed analysis
- Hydrological processes (precipitation, evaporation, infiltration, interception, soil moisture, run-off)
- Water quality
- Managing water resources
- Human impacts on the hydrological cycle
- Climate change and the hydrological cycle

Data collection and analysis activities (similar to labs):
Students will be required to undertake primary data collection and analysis activities to answer the posed question. They will be involved in the following activities which will be assessed in a manner similar to traditional labs (equivalent to eight labs) but will also be incorporated into the final project write-up. The data collection and analysis activities are:

1. Project design (Week 1)
2. Project implementation (Week 2)
3. Data collection (Weeks 3-8) – students will be collecting data on precipitation, evaporation, run-off, soil moisture, temperature, humidity, and other parameters as appropriate
4. Data analysis (Weeks 4-10) – analysis of the collected data will occur in conjunction with continued data collection activities and be completed following collection period