

Earth Sciences 3340a - Fall 2026 Course Outline

1. Course Information

Earth Sciences 3340a/b Watershed Hydrology

Schedule: Thursday's – lectures (section 001) 10:30 a.m. to 12:20 p.m. BGSB 1056; 1ab (section 002) 1:30 to 3:20 p.m. UC3220.

Prerequisites: Any 1.0 course equivalent at the 1000 level from Calculus, Mathematics, Applied Mathematics, Numerical and Mathematical Methods, Data Science, or Statistical Sciences.

- *Unless you have either the prerequisites for this course or written special permission from the Department of Earth Sciences to enroll in it, you may be removed and withdrawn from this course in accordance with university policy. This may be done after the add/drop deadline for the academic term, and the course will be marked as withdrawn (WDN) on your academic record. This decision may not be appealed.*

2. Instructor Information

Instructor: Rob Schincariol, Ph.D.

519-661-2111, ext. 83732, schincar@uwo.ca

Office Hours by appointment – email and a time will be arranged that meets both our schedules.

Students must use their Western (@uwo.ca) email addresses when contacting their instructors.

GTA: Tessa Lacasse, tlacass@uwo.ca; Martina Duarte mduart2@uwo.ca

3. Course Syllabus, Schedule, Delivery Mode

Description: Occurrence, movement, and behavior of water in the hydrologic cycle. The development of quantitative representations of hydrologic processes (e.g. precipitation, evapotranspiration, runoff, infiltration and unsaturated flow, saturated flow, surface flow). Analysis of stream response hydrographs. Statistical models of predicting flood responses and water resource management.

Learning Outcomes

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

- Apply quantitative skills to assess and evaluate all components of the hydrologic cycle including precipitation, evapotranspiration, surface water flow, unsaturated zone flow, and ground water flow.
- Framework calculations of hydrologic quantities, and water balances, within their respective data limitations, including model error and measurement error, both spatially and temporally.
- Delineate watersheds topographically and evaluate how topographic and subsurface hydrogeology processes affect watershed divides and basins.
- Assess current and historical precipitation patterns from online radar, satellite, and ground-based measurements.
- Assess historical and 'realtime' streamflow hydrographs both online and in the field through application of current meter, float, and dilution gaging methods.
- Comparative calculation of evapotranspiration through evaporation pan, water balance, FAO Penman-Monteith, and Thornthwaite and Mather models.
- Assess field saturated hydraulic conductivity and matric flux potential using the Guelph permeameter.
- Assess unsaturated hydraulic conductivity using a tension infiltrometer.
- Construct potentiometric maps and quantify ground water flow vectors and velocities.
- Quantify event and stream base flows using runoff models.
- Improve presentation skills ability.

Detailed Schedule

Sept. 10	lecture 1 Introductory concepts & Cycling
Sept. 17	lecture 2 (Precipitation); lab 1 help session
Sept. 24	lecture 3 (Evapotranspiration); lab 2 help session
Oct. 1	lecture 4 (Stream Hydraulics); lab 3 help session
Oct. 8	lecture 5 (Unsaturated Zone); lab 4 help session
Oct. 15	FALL BREAK
Oct. 22	lab test 1 in lecture (labs 1 to 4; 10:30 – noon held in BGSB 1056); lab session – work on group presentation*
Oct. 29	lecture – work on group presentations in lecture room; lab session -finish working on lab presentation and submit via Owl by 6 p.m. * lab test 1 makeup UC3220**
Nov. 5	Group Presentations 1 in lecture; Group Presentations 2 in lab
Nov. 12	Lecture 6 (Groundwater); lab 5 help session
Nov. 19	Lecture test – (11:00 a.m. to 11:50 a.m.) lectures 1 to 5 + presentations (held in BGSB 1056); no lab
Nov. 26	Lecture 7 (Water Budget review of all components); lab test 2 UC3220 1:30 – 2:25 p.m.; lecture test makeup UC3220 2:30 – 3:20 p.m.**
Dec. 3	No lecture; lab test 2 makeup BGSB 1056 10:30 – 11:25 a.m.**
*	Oct 22 and 29 th group presentation work time – Be sure to utilize these periods to work on your group presentations as groups may contain students from multiple departments with different schedules. This course typically attracts 3 rd and 4 th year students from Science, Engineering, and Social Sciences.
**	For those granted accommodation.

Contingency plan

Although the intent is for this course to be delivered in person, should any university-declared emergency require some or all of the course to be delivered online, either synchronously or asynchronously, the course will adapt accordingly. The grading scheme will **not** change. Any assessments affected will be conducted online as determined by the course instructor.

4. Course Materials

Text: Physical Hydrology 3rd Edition, S. Lawrence Dingman, ISBN 978-1-4786-1118-9, 2015 Waveland Press. Textbook in hard copy (new & used) and electronic formats is available directly various vendors. Examples include:

- VitalSource <https://www.vitalsource.com/en-ca/textbooks?sort=&term=dingman+physical+hydrology> 120 days rental \$71.56
- amazon.ca Kindle Edition \$136.37
- google Play Ebook \$110.83
- amazon.com various used textbooks for sale
- Waveland Press \$129.95 U.S. <https://www.waveland.com/browse.php?t=382>

You will absolutely require the textbook as lectures and lab work directly with material / figures from the text that are not reproduced in the lecture slides. The lectures will guide you into what sections (and what ‘depth’) you are required to understand. This text is routinely used in practice. As such it is quite extensive and goes into much greater depth on many topics than is required for this course.

Students should check OWL Brightspace <https://westernu.brightspace.com/> on a regular basis for news and updates. This is the primary method by which information will be disseminated to all students in the class. Students are responsible for checking OWL on a regular basis.

If students need assistance with the course OWL site, they can seek support on the [OWL Brightspace Help](#) page. Alternatively, they can contact the Western Technology Services Helpdesk. They can be contacted by phone at 519-661-3800 or ext. 83800.

The main purpose of the lectures is to help you understand key hydrological processes and techniques used to quantify these processes. The labs apply the techniques. Case studies / consulting reports give you the real-world application of these techniques.

Technical Requirements – A stable internet connection, computer with working microphone and webcam, Microsoft Excel software, ability to print in colour (at home or store front), scanner or camera (cell phone is fine). Class group presentations will be via Zoom.

5. Methods of Evaluation**

<u>Marking Scheme:</u>	<i>Date</i>	<i>Makeup for those granted accommodation</i>
Lab test 1 (90 minutes)	25% Oct. 22 BGSB 1056 10:30 – noon	Oct. 29 UC3220 1:30 – 3:00 p.m.
Lecture test (50 minutes)	35% Nov. 19 BGSB 1056 10:30 – noon	Nov. 26 UC3220 2:30 – 3:20 p.m.
Group presentations	20% Nov. 5	
Lab test 2 (55 minutes)	20% Nov. 26 UC3220 1:30 – 2:25 p.m.	Dec. 3 BGSB 1056 10:30 – 11:25 a.m.

** Tests

- All tests will be ‘closed book’. All work must be done independently. Not adhering to these conditions will be considered a scholastic offence. *Scholastic offences are taken seriously and students are directed to read the appropriate policy, specifically, the definition of what constitutes a Scholastic Offence, at the following Web site: http://www.uwo.ca/univsec/pdf/academic_policies/appeals/scholastic_discipline_undergrad.pdf.*
- Lab tests - No aids permitted other than basic non-memory calculator, pencils / pen, ruler, protractor. Cell phones must remain on ‘silent’ and in bags / backpacks. Lab tests involve calculations and are based on lab material. However, an understanding of lecture material is often required to do the labs.
- Lecture tests no aids permitted (pen or pencil only). Cell phones must remain on ‘silent’ and in bags / backpacks.
- Lecture & Lab tests - You should use the washroom prior to the test as the ability to take breaks will be very limited (i.e. emergency only). As per university policy GTA’s must accompany students to the washroom which will necessitate only one student leaving the room at a time. This is one reason the tests are kept as short as possible.
- You are strongly encouraged to attend all lectures and take notes. Tests & final exam focus on material discussed in class within certain contexts. If you miss lectures you will not understand how to answer the test questions properly. Tests & exams are graded only on the material discussed in class and provided on the course web site. Therefore, even though answers may contain valid information, this information will receive no marks if it was not from the lectures and course notes or assigned readings or other assigned material.
- All work must be done independently. Not adhering to these conditions will be considered a scholastic offence. Scholastic offences are taken seriously, and students are directed to read the appropriate policy, specifically, the definition of what constitutes a Scholastic Offence, at the following Web site: http://www.uwo.ca/univsec/pdf/academic_policies/appeals/scholastic_discipline_undergrad.pdf.

*Group Presentations

- While the group is evaluated for the grading individual members may receive a higher or lower grade than ‘the group’. Group presentations are such that each member of the group will be responsible for a given component of the water budget. As such each group member will present their work on this component as part

of the overall group presentation. This will allow for adjustments to individual grading should certain member perform well above or below the group average.

- You are to use the tools provided in the labs to quantify all components of the water budget. If values are also provided in various conservation or consulting reports list these along with your calculations as a comparator.
- All group presentations are due by 6 p.m. Oct. 29th via Owl submitted as a 'ppt show'. Late submissions will receive a 20% per day penalty.

Generative AI Tools (ChatGPT, Copilot, Gemini) are **prohibited** in this course.

Essential Learning Requirements

All tests must be completed to earn a passing grade in this course. If Academic Consideration is granted that will give you access to the makeup test. When a student has not demonstrated proficiency in an essential learning requirement listed above (i.e. Lecture Test, Lab Test 1, Lab Test 2), and when the shortfall results from a granted Academic Consideration, they will be withdrawn (WDN) from the course. The student may appeal to the Associate Dean (Academic) for reinstatement with an Incomplete (INC) standing. Where an appeal for INC is granted, their maximum course load may be reduced during the term in which they complete the outstanding course requirements.

Information about Missed Coursework

Students must familiarize themselves with the *University Policy on Academic Consideration – Undergraduate Students in First Entry Programs* posted on the Academic Calendar:

https://www.uwo.ca/univsec/pdf/academic_policies/appeals/academic_consideration_Sep24.pdf,

This policy does not apply to requests for Academic Consideration submitted for **attempted or completed work**, whether online or in person. The policy also does not apply to students experiencing longer-term impacts on their academic responsibilities. These students should consult [Accessible Education](#).

For procedures on how to submit Academic Consideration requests, please see the information posted on the Office of the Registrar's webpage:

https://registrar.uwo.ca/academics/academic_considerations/

All requests for Academic Consideration must be made within 48 hours after the assessment date or submission deadline.

Tests

This course does not have a final exam. All testing requirements are met through the two lab tests (Oct. 22nd and Nov. 26th) and one lecture test (Nov. 19th). Makeup tests are available one week after the scheduled test (i.e. Oct. 29th, Dec. 3rd, Nov. 26th, respectfully) to those granted accommodation.

All Academic Consideration requests must include supporting documentation; however, recognizing that formal documentation may not be available in some extenuating circumstances, the policy allows students to make one Academic Consideration request **without supporting documentation** in this course. However, the following assessments are excluded from this, and therefore always require formal supporting documentation.

- Lecture test

If a student misses a makeup test and is approved for Academic Consideration, they will be withdrawn from the course without academic penalty. A student may appeal to the Associate Dean (Academic), on a case-by-case basis, for the opportunity to write the test the next time the course is offered. If a student misses the test and Academic Consideration is not approved, or was not requested, they will receive a grade of zero on the test.

When a student *mistakenly* submits their one allowed Academic Consideration request **without supporting documentation** for the assessments listed above or those in the **Coursework with Assessment Flexibility** section below, the request cannot be recalled and reapplied. This privilege is forfeited.

Evaluation Scheme for Missed Assessments

Missed group presentations will be reweighted equally to the three tests.

6. Additional Statements

6.1 Religious Accommodation

When a recognized religious holiday either requires a student to be absent from the University, or requires or prohibits an activity that makes it impossible for them to complete an academic requirement scheduled that day, they are entitled to accommodation. No student will be penalized for an absence for religious reasons, and an alternative means of satisfying the requirement will be arranged. This accommodation is provided in accordance with the University's policy on Accommodation for Religious Holidays:

https://www.uwo.ca/univsec/pdf/academic_policies/appeals/accommodation_religious.pdf

The student should submit their requests through the Student Absence Portal (SAP), identifying the conflict and the specific course component(s) affected (e.g., test, midterm, exam).

Tests: If a religious observance conflicts with a test, they must submit their request no later than **one week** before the test. The makeup test will then be available for the student to write.

Students are responsible for finding out what was covered in any class they miss due to a religious observance, and for taking the appropriate steps to keep up with the course.

If a suitable arrangement cannot be reached between a student and their instructor, they should consult the Undergraduate Chair of the department offering the course, and if necessary, the Associate Dean (Academic) of the Faculty of Science.

For a list of recognized religious observances, please visit the calendars posted on the Equity, Diversity & Inclusion website - <https://www.edi.uwo.ca> (About Us – Resources – Additional Resources – Calendars).

6.2 Academic Accommodation Policies

Students with disabilities are encouraged to contact Accessible Education, which provides recommendations for accommodation based on medical documentation or psychological and cognitive testing. The policy on Academic Accommodation for Students with Disabilities can be found at:

https://www.uwo.ca/univsec/pdf/academic_policies/appeals/Academic_Accommodation_disabilities.pdf.

6.3 General Academic Policies

The website for Registrar Services is <https://www.registrar.uwo.ca/>.

Use of @uwo.ca email: In accordance with policy, https://www.uwo.ca/univsec/pdf/policies_procedures/section1/mapp113.pdf, the centrally administered e-mail account provided to students will be considered the individual's official university email address. It is the responsibility of the account holder to ensure that emails received from the University at their official university address are attended to in a timely manner.

Requests for Relief (formally known as “appeals”)

Policy on Request for Relief from Academic Decision:

https://uwo.ca/univsec/pdf/academic_policies/appeals/requests_for_relief_from_academic_decisions.pdf

Procedures on Request for Relief from Academic Decision (Undergraduate):

https://uwo.ca/univsec/pdf/academic_policies/appeals/undergrad_requests_for_relief_procedure.pdf

[If cross-listed as a grad course] Procedures on Request for Relief from Academic Decision (Graduate):

https://uwo.ca/univsec/pdf/academic_policies/appeals/graduate_requests_for_relief_procedure.pdf

6.4 Scholastic Offences

Policy on Scholastic Offences: https://uwo.ca/univsec/pdf/academic_policies/appeals/scholastic_offences.pdf

Procedures on Scholastic Offences (Undergraduate):

https://uwo.ca/univsec/pdf/academic_policies/appeals/undergrad_scholastic_offence_procedure.pdf

[If cross-listed as a grad course] Procedures on Scholastic Offences (Graduate):

https://uwo.ca/univsec/pdf/academic_policies/appeals/graduate_scholastic_offence_procedure.pdf

Use of Electronic Devices During Assessments

In courses offered by the Faculty of Science, the **possession** of unauthorized electronic devices during any in-person assessment (such as tests, midterms, and final examinations) is strictly prohibited. This includes, but is not limited to: mobile phones, smart watches, smart glasses, hidden cameras and wireless earbuds.

Unless explicitly stated otherwise in advance by the instructor, the presence of any such device at a student's desk, on their person, or within reach during an assessment will be treated as a scholastic offence, **even if the device is not in use**.

Effective September 2026, the typical penalty for this offence is a failing grade in the course AND a 12-month prohibition on retaking the course.

Only devices expressly permitted by the instructor (e.g., non-programmable calculators) may be brought into the assessment room. It is their responsibility to review and comply with these expectations.

Use of Generative AI Tools

Unless otherwise stated, the use of generative AI tools (e.g., ChatGPT, Microsoft Copilot, Google Gemini, or similar platforms) is **not permitted** in the completion of any course assessments, including but not limited to: assignments, lab reports, presentations, tests, and final examinations.

Using such tools for content generation, code writing, problem solving, translation, or summarization—when not explicitly allowed—will be treated as a **scholastic offence**.

If the use of generative AI is permitted for a particular assessment, the conditions of use will be specified by the instructor in advance. If no such permission is granted, students must assume that use is prohibited. It is the student's responsibility to seek clarification before using any AI tools in academic work.

6.5 Support Services

Academic Advising. Please visit the Science & Basic Medical Sciences Academic Advising webpage for information on adding/dropping courses, academic considerations for absences, requests for relief, exam conflicts, and many other academic-related matters: <https://www.uwo.ca/sci/advising/>.

Mental Health Support. Students who are in emotional/mental distress should refer to Mental Health@Western (<https://uwo.ca/health/>) for a complete list of options about how to obtain help.

Gender-Based and Sexual Violence. Western is committed to reducing incidents of gender-based and sexual violence (GBSV) and providing compassionate support to anyone who has gone through these traumatic events. If a student has experienced GBSV (either recently or in the past), they can find information about support services for survivors, including emergency contacts, at:

https://www.uwo.ca/health/student_support/survivor_support/get-help.html.

To connect with a case manager or set up an appointment, please contact support@uwo.ca.

Accessibility for Coursework. A student may contact the course instructor if they require lecture or printed material in an alternate format or if any other arrangements can make this course more accessible to them. If they have any questions regarding accommodations, they may also contact Accessible Education at http://academicsupport.uwo.ca/accessible_education/index.html

Learning Development and Success. Learning-skills counsellors at Learning Development and Success (<https://learning.uwo.ca>) are ready to help students improve their learning skills. The facility offers strategies for improving time management, multiple-choice exam preparation/writing, textbook reading, and more. Individual support is offered throughout the Fall/Winter terms in the drop-in Learning Help Centre, and year-round through individual counselling.

Student Councils.

Student-run support services are offered by the University Students' Council (<https://westernusc.ca>) and the Science Students' Council (<https://www.westernssc.ca>).