

GEOGENV 3311A – Micrometeorology

Course Outline: Section 001 Fall 2026

This course is taught in-person

1. Course Information

*Details about design and delivery of the course are listed below in Section 6



Classes Start	Fall Reading Week	Classes End	Study day(s)	Exam Period
September 9	October 10-18	December 9	December 10	December 11-22

Thursday September 17, 2026: Last day to add a second-term half course

Wednesday September 30, 2026: National Day for Truth and Reconciliation (non-instructional day).

Monday October 12, 2026: Thanksgiving Holiday

Monday November 30, 2026: Last day to drop a first term half course without penalty



Course Instructor	Contact Information	Office Hours
Chris Hopkinson	Chris.hopkinson@uwo.ca SSC 1405	Wednesday 2:00-3:00 or set up an appointment by email

Teaching Assistant(s)	Contact Information	Office Hours
Kevin Ng	Kng342@uwo.ca SSC 2316	Wednesday 9:30-10:30

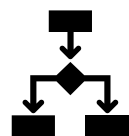


☒ Office hours will be held in person or via Teams

☒ Students will be able to sign up for an appointment using email

2. Calendar Description

Principles of weather and climate at micro-, local, and meso-scales; processes associated with transfer of heat, mass, and momentum and resulting climates near the surface; local winds, fog, urban climates and air pollution.



2 lecture + 2 lab hours, 0.5 course

Antirequisite(s): None

Prerequisite(s): One of Geography 2310A/B, Geography 2320A/B or Geography 2330A/B, or at least 3rd year standing in an Environmental Science or Earth Sciences program. (A 1000-1099 level course in Applied Mathematics, Mathematics, or Physics is also recommended).

Prerequisite checking is the student's responsibility

Senate Regulations state, "unless you have either the requisites for this course or written special permission from your Dean to enroll in it, you will be removed from this course and it will be deleted from your record. This decision may not be appealed. You will receive no adjustment to your fees in the event that you are dropped from a course for failing to have the necessary prerequisites."

3. Textbook

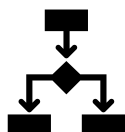


☒ All resources (lectures, labs, assignments) will be posted in OWL

☒ Recommended textbook: Oke, T.R. 1987. Boundary Layer Climates, 2nd Edition See also: Oke et al. 2017. Urban Climates, Cambridge University Press. Available from Western Libraries (online)

4. Course Objectives and Format

This course provides an introduction to the study of micrometeorology and microclimatology. It examines the processes that underly the behaviour of the atmosphere close to the surface; specifically, the transfer of heat, mass and momentum and how these modify the microclimate. Course materials cover theoretical and analytical examination of the processes that occur (i.e. we use equations and numbers in this course). An introduction to micrometeorological instrumentation, data loggers and telemetry is also provided.

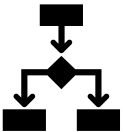


Micrometeorology and microclimatology are generally restricted to that portion of the atmosphere known as the planetary boundary layer, so this course does not examine weather per se, but does deal with some local to mesoscale atmospheric effects such as sea breezes, elevation gradients and atmospheric conditions important to air pollution. Micro-meteorology and climatology are becoming increasingly important as societies deal with large scale climate change. Cities represent a modified microclimate and intentional changes to surface characteristics in cities (and other environments) can form the basis of climate adaptation techniques – and this knowledge comes from the study of micrometeorology.

Assignments require some hands-on instrument handling, use of computer spreadsheets for calculation and data analysis, written reporting on assigned exercises, and oral presentation of concepts. Course evaluation will be based on team-based case studies, with blended group and individual performance providing the basis for grading. Participation in class discussion is encouraged and evaluated.

At the end of the course, you should be able to:

- explain how the surface radiation budget and energy balance affect surface climates
- describe important surface characteristics that affect surface energy balance and surface microclimates
- use numerical techniques to estimate surface energy balance terms
- understand and use basic instrumentation related to micrometeorology • analyze and explain the surface energy balance from measurements
- explain practical applications of the surface energy balance to society



☒ Attendance is required for lab components, as there will be group work and resources are limited. Resources and timing for assignments will be updated on OWL Brightspace.

All course material will be posted to the OWL Brightspace learning environment: <https://westernu.brightspace.com/d2l/home>. Any changes will be indicated on the OWL site and discussed with the class.

Current versions of all popular browsers (e.g., Safari, Chrome, Edge, Firefox) are supported with OWL Brightspace; what is most important is that you update your browser frequently to ensure it is current. All JavaScript and cookies should be enabled.

If students need assistance, 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.

5. Learning Outcomes

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

- Develop knowledge and critical understanding of the fundamental characteristics, processes, temporal changes and landscapes of social and biophysical systems and their interactions - in particular spatio-temporal variations of the near surface climate, especially as described through the surface radiation and energy balances.
- Relate specialized understanding of the geography of bio-physical systems to knowledge and practices in environmental and natural sciences
- Use the fundamental knowledge of the physical basis of near-surface climates to explain how microclimates can be expected to vary in space and time.
- Collect, analyze and interpret data from measurement systems that are used to monitor near-surface climate and surface radiation and energy balances.



6. Course Content and Schedule

Week	Dates	Lecture Topic	Lab discussion / practical
1	Sept 9		Course Introduction: Micrometeorology & the Atmospheric Boundary Layer
2	Sept 14, 16	Radiation, Energy and Water Balance Concepts Measurement Source Areas	Instrumentation & data loggers + Case Study Group work & discussion
3	Sept 21, 23	Solar Radiation	Radiation & Energy Balance + Case Studies
4	Sept 28	Surface Temperature and Longwave Radiation	Case Studies
5	October 5, 7	Air temperature & sensible heat flux	Thermal Infrared Radiometry + Case Studies
	<i>October 12-16</i>	<i>Fall Reading Week</i>	<i>N/A</i>
6	October 19, 21	Humidity & latent heat flux	Case Study Topics
7	October 26, 28	Local scale circulations; winds near the surface	Soil heat flux + Case Studies Instrument & data logger report due Oct 30, 23:59
8	November 2, 4	Non-homogeneous terrain climates	Case Studies
9	November 9, 11	Mountain & cold region micro-meteorology	Latent Heat / Evaporation + Case Studies
10	November 16, 18	Urban microclimates	Case Studies + Energy Balance report due Nov 20, 23:59
11	November 23, 25	Dynamic stability & turbulence	Case Studies
12	Nov 30, Dec 2	Air pollution meteorology	Case Studies
13	December 7, 9	In class Case Study presentations	In class presentations Annotated presentation file due Dec 10 23:59



7. Communication



- ☒ Students should check the OWL site twice per week – ideally one day before lecture or lab session; we will update the OWL Announcements on an as-needed basis.
- ☒ For any other communication, the centrally administered **e-mail account** provided to students will be considered the individual's official university e-mail address. It is the responsibility of the account holder to ensure that e-mail received from the University at his/her official university address is attended to in a timely manner. You can read about the privacy and security of the UWO email accounts [here](#).
- ☒ Emails will be monitored daily; students will receive a response in 24 – 48 hours

8. Evaluation

Below is the evaluation breakdown for the course, which is based on a team-based project format will be presented in the first class, whereby the class divides into groups of three or four individuals to design, implement, report and present a real-world micro-meteorological data collection and analysis case study. The instructor will work with the class to structure, resource and evaluate the project. A project-based case study will not reduce the material covered or the effort required to pass but it should enable some flexibility in the division of tasks amongst group members, while allowing students to focus more on their areas of strength. If the group case study option is selected, a new assessment schedule will be drawn up and communicated by the second week of class.

Assessment	Format	Weighting	Due Date
Instrument, logger & metadata report	Written; with numerical and graphical analyses	20	Oct 30, 23:59 (OWL submission)
Energy Balance & Microclimatology report	Written; with numerical and graphical analyses	20	Nov 20, 23:59 (OWL submission)
Case Study topic ~45-50 min group presentation	Oral presentation + Annotated submission (e.g. PowerPoint)	20 (Oral) 15 (Report)	Dec. 7 & 9 (In class presentation; Dec. 10, 23:59 (OWL submission))
Participation	Attendance + Contribution to Group work	15 10	>= 80% attendance = 15 50/50 Peer/Instructor review of effort

The evaluation methods described above are essential course requirements.

Students are responsible for reviewing material covered in the lectures as well as any assigned materials.

Students must work in groups and contribute to all three reporting exercises to complete the course.

- ☒ All assignments are due at 11:59 pm EST unless otherwise specified
- ☒ Written assignments will be submitted to Turnitin (statement in policies below)
- ☒ After an assessment is returned, students should wait 24 hours to digest feedback before contacting their evaluator; to ensure a timely response, reach out within 7 days

Click [here](#) for a detailed and comprehensive set of policies and regulations concerning examinations and grading. The table below outlines the University-wide grade descriptors.

A+	90-100	One could scarcely expect better from a student at this level
A	80-89	Superior work which is clearly above average
B	70-79	Good work, meeting all requirements, and eminently satisfactory
C	60-69	Competent work, meeting requirements
D	50-59	Fair work, minimally acceptable
F	below 50	Fail

Grades will not be adjusted on the basis of need. It is important to monitor your performance in the course. Remember: *You* are responsible for your grades in this course.

9. Accommodation Policies

Students with disabilities work with Accessible Education (formerly SSD) which provides recommendations for accommodation based on medical documentation or psychological and cognitive testing. The accommodation policy can be found here: [Academic Accommodation for Students with Disabilities](#).

General Information about missed work:

University policy on academic considerations are described [here](#). This policy requires that all requests for academic considerations must be accompanied by a self-attestation. Further information about academic considerations, and information about submitting this self-attestation with your academic consideration request may be found [here](#).

Please note that any academic considerations granted in this course will be determined by the instructor, in consultation with the academic advisors in your Faculty of Registration, in accordance with information presented in this course outline.

Flexibility statements

Please note that because the assignments require regular input to team-based efforts, and are set up early to provide a prolonged window within which to make progress, the instructor reserves the right to deny academic consideration for assignments submitted following the posted deadline.

Absence from Course Commitments

Students must familiarize themselves with the [Policy on Academic Consideration – Undergraduate Students in First Entry Programs](#)

Students missing course work for medical, compassionate or extenuating circumstances can request academic consideration by completing a request at the central academic consideration portal. Students are permitted one academic consideration request per course per term without supporting documentation. Note that supporting documentation is **always** required for academic consideration requests for examinations scheduled by the office of the registrar (e.g. December and April exams) and for practical laboratory and performance tests typically schedule during the last week of the term. Students should also note that the instructor may designate one assessment per course per term that requires supporting documentation. This designated assessment is described elsewhere in this document. Please note that any academic considerations granted in this course will be determined by the instructor of this course, in consultation with the academic advisors in your Faculty of Registration, in accordance with information presented in this course outline. Supporting documentation for

academic considerations for absences due to illness should use the Student Medical Certificate or, where that is not possible, equivalent documentation by a health care practitioner.

Course Assessments that Require Supporting Documentation

Any student that misses the oral presentation assessment or more than 5 lab periods will be required to provide documentation (e.g. a formal medical note).

Academic Consideration for Course Components with Flexible Deadlines

The assignment deadlines can be found above in the course outline. For each assignment, students are expected to submit the assignment by the deadline listed to avoid an automatic late penalty, which will be 10% for the first day and 20% per day, thereafter. Should illness or extenuating circumstances arise ahead of the deadline listed, students can request a delay of the submission of their assignment of up to 72 hours without academic penalty. Should students that have been granted an extension submit their assessment beyond 72 hours past the deadline, a late penalty of 20% per day will be subtracted from the assessed grade. If you have a long-term academic consideration or an accommodation for disability that is expected to influence your ability to meet the deadlines, please reach out to your instructor at least one week prior to the posted deadline.

Accommodation for Religious Holidays

Students should review the policy for Accommodation for Religious Holidays. Where a student will be unable to write examinations and term tests due to a conflicting religious holiday, they should inform their instructors as soon as possible but not later than two weeks prior to writing the examination/term test. In the case of conflict with a midterm test, students should inform their instructor as soon as possible but not later than one week prior to the midterm.

10. Make-up Examinations

Make-up examinations are not provided in this course.

11. Use of Electronic Devices

Students will need to use software (e.g. Microsoft Excel) and/or calculators as a normal part of completing lab assignments and reports in this course.

12. How to Be Successful in this Class:

Students enrolled in this class should understand the level of autonomy and self-discipline required to be successful.

1. Invest in a planner or application to keep track of your courses. Populate all your deadlines at the start of the term and schedule time at the start of each week to get organized and manage your time.
2. Make it a daily habit to log onto OWL to ensure you have seen everything posted to help you succeed in this class.
3. Follow weekly checklists created on OWL or create your own to help you stay on track.
4. Take notes as you go through the lesson material. Keeping handwritten notes or even notes on a regular Word document will help you learn more effectively.

5. Connect with others. Try forming a study group and try meeting on a weekly basis for study and peer support.
6. Do not be afraid to ask questions. If you are struggling with a topic, check the online discussion boards or contact your instructor(s) and or teaching assistant(s).
7. Reward yourself for successes. It seems easier to motivate ourselves knowing that there is something waiting for us at the end of the task.

13. Use of Generative Artificial Intelligence (AI)

A guiding principle in this course is that any assignments submitted for evaluation are the original work of the named person/s submitting the work. And, if questioned the author/s will be able to demonstrate that they understand and can explain the methods, findings, opinions and/or any underlying concepts discussed in the assignment submission. With this in mind, the use of AI is permitted as an aid in the learning, analytical, reporting and communication processes but not as a replacement for those processes.

For example, predictive or generative AI can be useful as an aid to help code or determine appropriate numerical operations for data analysis and graphing. AI tools can also be useful for improving written work (i.e. submitting a draft text to check for grammar errors, or to improve the organization of ideas, etc.), or for creating graphical illustrations of concepts. Such uses of AI tools to aid the learning process are permitted in this course. However, analysis and presentation of data in assignments should be your own work. Written reports must represent your own understanding and intentional communication of the material presented.

You must specify what (if any) use of AI was made in support of any assignment submissions. The use of AI in a non-permitted manner or the non-disclosure of use of AI in any course assignment risks a zero mark on that submission.

14. Academic Offences

Scholastic offences are taken seriously and students are directed to read the appropriate policy, specifically, the definition of what constitutes a Scholastic Offence.

15. Western's Commitment to Accessibility

The Department of Geography and Environment strives at all times to provide accessibility to all faculty, staff, students and visitors in a way that respects the dignity and independence of people with disabilities.

Please contact the course instructor if you require material in an alternate format or if you require any other arrangements to make this course more accessible to you. You may also wish to contact Services for Students with Disabilities (SSD) at 519-661-2147 for any specific question regarding an accommodation. Information regarding accommodation of exams is available on the Registrar's website.

More information about "Accessibility at Western" is available.

16. Mental Health

Students who are in emotional/mental distress should refer to [Mental Health@Western](mailto:MentalHealth@Western) for a complete list of options about how to obtain help.

17. Support Services

[Office of the Registrar](#)

[Western's Support Services](#)

[Student Experience](#)

Western is committed to reducing incidents of gender-based and sexual violence and providing compassionate support to anyone who has gone through these traumatic events. If you have experienced sexual or gender-based violence (either recently or in the past), you will find information about support services for survivors, including emergency contacts [here](#).

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

18. Important Dates

September 9: Classes resume

September 17: Last day to add a first term half course

September 30: [National Day for Truth and Reconciliation](#) (non-instructional day).

October 12: Thanksgiving Holiday – Department Office Closed

October 12-16: Fall Reading Week (No classes; Department Office open)

November 30: Last day to drop a first term half course or a full course without penalty

December 9: Classes end

December 10: Study day

December 11-22: Examination Period