

# ENVS\*2030 - Meteorology and Climatology

Fall 2023 Course Outline

Section: 01

Credits: 0.50

## Land Acknowledgement: Guelph

The University of Guelph resides on the ancestral lands of the Attawandaron people and the treaty lands and territory of the Mississaugas of the Credit. We recognize the significance of the Dish with One Spoon Covenant to this land and offer respect to our Anishinaabe, Haudenosaunee and Métis neighbours. Today, this gathering place is home to many First Nations, Inuit, and Métis peoples and acknowledging them reminds us of our important connection to this land where we work and learn.

## Calendar Description

This course examines solar and terrestrial radiation; pressure systems and winds; atmospheric stability and vertical motions; air masses and fronts; clouds and precipitation; selected topics in applied meteorology including air pollution. The laboratory emphasizes the analysis and use of atmospheric data for solving environmental problems.

**Prerequisite(s):** 1 of IPS\*1500, MATH\*1080, MATH\*1200, PHYS\*1070, PHYS\*1080, PHYS\*1130, PHYS\*1300

**Department(s):** School of Environmental Sciences

## Course Description

This course examines solar and terrestrial radiation; pressure systems and winds; atmospheric stability and vertical motions; air masses and fronts; clouds and precipitation; tropical weather systems: air pollution and climate change.

## Lecture Schedule

MonWedFri 8:30am-9:20am in ANNU\*156 (9/7 to 12/15)

## Lab / Seminar Sections

<instructor can choose which table they'd like to use. **Title and Content within this block is fully editable & removeable**>

NOTE: To add another ROW, go to the bottom right cell of table and press 'tab' button. To delete a ROW contact courseleaf@uoguelph.ca

Day	Time	Location

Day	Time	Location	Sections
Tue	3:30-5:20 PM	ANNU 306	103
Wed	3:30-5:20 PM	MCKN 314	102
Thu	3:30-5:20 PM	MCKN 308	101

## Instructor Information

Jon Warland  
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 Office: Johnston Hall 103A

Scott Krayenhoff  
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## Additional Support

### Teaching Assistants

Hang Yin: [hyin09@uoguelph.ca](mailto:hyin09@uoguelph.ca)

Alireza Saeedi: [saeedia@uoguelph.ca](mailto:saeedia@uoguelph.ca)

## Textbooks

Group	Title	Author	ISBN
Recommended	Meteorology Today: An Introduction to Weather, Climate, and the Environment	C. Donald Ahrens, Peter L. Jackson, and Chris Jackson	0-17-650039-1

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## Learning Resources

### Required Resources

#### CourseLink

This course is being offered using CourseLink (powered by D2L's Brightspace), the University of Guelph's online learning management system (LMS). By using this service, you agree to comply with the University of Guelph's Access and Privacy Guidelines. Please visit the D2L website to review the Brightspace privacy statement and Brightspace Learning Environment web accessibility standards. Page 3 of 14

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<http://www.uoguelph.ca/web/privacy/> <https://www.d2l.com/legal/privacy/> <https://www.d2l.com/accessibility/standards/> Technical Support If you need any assistance with the software tools or the CourseLink website, contact CourseLink Support. Email: [courselink@uoguelph.ca](mailto:courselink@uoguelph.ca) Tel: 519-824-4120 ext. 56939 Toll-Free (CAN/USA): 1-866-275-1478 Support Hours (Eastern Time): Monday thru Friday: 8:30 am–8:30 pm Saturday: 10:00 am–4:00 pm Sunday: 12:00 pm–6:00 pm

#### Recommended Resources

Meteorology Today: An Introduction to Weather, Climate, and the Environment by C. Donald Ahrens, Peter L. Jackson, and Chris Jackson, 1st Canadian edition, published by Nelson (ISBN-10: 0-17-650039-1, (Textbook)

### Campus Resources

If you are concerned about any aspect of your academic program: Make an appointment with a Program Counsellor (<https://www.uoguelph.ca/uaic/programcounsellors/>) in your degree program. If you are struggling to succeed academically. There are numerous academic resources offered by the Learning Commons (<https://www.lib.uoguelph.ca/using-library/spaces/learning-commons/>) including, Supported Learning Groups for a variety of courses, workshops related to time management, taking multiple choice exams, and general study skills.

## Library Course Reserve (Ares)

For this course, you have access the textbook through the University of Guelph McLaughlin Library. To access it, select **Ares** on the navbar in CourseLink. Note that you will need your Central Login ID and password in order to access items on reserve.

For further instructions on accessing reserve resources, visit [How to Get Course Reserve Materials \(https://lib.uoguelph.ca/find/course-reserves-ares/how-get-course-reserve-material/\)](https://lib.uoguelph.ca/find/course-reserves-ares/how-get-course-reserve-material/).

If at any point during the course you have difficulty accessing reserve materials, please contact the e-Learning Operations and Reserve Services staff at:

Tel: 519-824-4120 ext. 53621 | Email: [libres2@uoguelph.ca](mailto:libres2@uoguelph.ca) | Location: McLaughlin Library, First Floor, University of Guelph

## Course Learning Outcomes

1. Identify weather instruments and state how they are placed in a weather station;
2. Use laws of radiation to explain radiation transfer in the environment and solve problems related to radiation budgets;
3. Apply the energy budget concept to explain the Earth's climate at the surface and human thermal comfort;

4. Describe, use and convert measures that quantify atmospheric water vapour;
  5. Predict the formation of clouds and rain using atmospheric sounding data and a skew-T diagram;
  6. Describe the Bergeron process for formation of precipitation using the concept of vapour pressure over water and ice;
  7. Predict wind speed and direction from isobars and isoheights using a force-body diagram;
  8. Access public data on weather and climate, including historical records, current and forecast conditions;
  9. Interpret surface and upper air weather maps, including all basic symbols, and use this to state current weather conditions at any point;
  10. Use the Norwegian cyclone model and the concepts of air masses and fronts to produce a short-range forecast from a map of current conditions;
  11. Use the Hadley cell model, trade winds and the ITCZ to explain precipitation patterns in the tropics;
12. Apply simple models to predict the dispersion of air pollutants;
  13. Explain uncertainties in climate change predictions using the concepts of positive and negative feedback in the climate system.

## Schedule of Topics and Assignments

Week of	Topic	Activities	Due:
9/8	Introduction to the course		
9/11	Radiation		
9/18	Radiation	Lab 1 - Radiation	
9/25	Water in the Atmosphere		Lab 1 (Sep. 25)
10/2	Stability and Clouds	Lab 2 - Climate and Comfort	
10/9	Holiday (No class)		
10/11	Midterm 1 (Oct. 13)		Lab 2 (Oct. 10)
10/16	Precipitation Processes	Lab 3 - Stability	
10/23	Atmospheric Motions		Lab 3 (Oct. 23)
10/30	Air Masses and Fronts	Lab 4 - Wind and Maps	
11/6	Midlatitude Cyclones		Lab 4 (Nov. 6)
11/13	Tropical Weather Systems	Lab 5 - Fronts and Forecasting	
11/20	Midterm 2 (Nov. 20) Air Quality	Lab 6 - Air Quality (Thu. lab)	Lab 5 (Nov. 22)
11/27	Climate Change	Lab 6 - Air Quality (Tue, Wed labs)	Thu. lab: Lab 6 (Nov. 27) Tue, Wed labs: Lab 6 (Dec. 1)

## Lab / Seminar Schedule

## Assessment Breakdown

{NOTE: instructor can add another row by hitting "TAB" button when they are at the end of the row}

Description	Weighting (%)	Due Date
Lab 1*	5%	Sep. 25
Lab 2*	5%	Oct. 10
Lab 3*	5%	Oct. 23
Lab 4*	5%	Nov. 6
Lab 5*	5%	Nov. 22
Lab 6*	5%	Nov. 27 (Thu lab); Dec. 1 (Tue, Wed labs)
Mid-Term Exam 1	20% (10% in-class portion, 10% take-home part)	Oct. 13
Mid-Term Exam 2	20% (10% in-class portion, 10% take-home part)	Nov. 20
Final Exam	35%	Dec. 14, 8:30-10:30 AM

	*the lowest lab mark will be dropped (i.e. only 5 out of 6 labs will be considered in the final mark)	

## Assessment Details

### Final Exam

Date: Dec 14

Time: Th 8:30am-10:30am

Location: TBA *Please see Web Advisor closer to the date of scheduled final for location.*

To understand rules and regulations regarding Examinations students are encouraged to read Student's Responsibilities (<https://calendar.uoguelph.ca/undergraduate-calendar/undergraduate-degree-regulations-procedures/examinations/>)

If the student is unable to meet the final exam requirements due to medical, psychological or compassionate circumstances they are encouraged to review Student's Responsibilities in the Academic Consideration, Appeals and Petitions (<https://calendar.uoguelph.ca/undergraduate-calendar/undergraduate-degree-regulations-procedures/academic-consideration-appeals-petitions/>) section of the Academic Calendar.

### Last Day to Drop Course

The deadline to drop Fall 2023 courses without academic penalty is the last day of classes: December 01

After this deadline, a mark will be recorded, whether course work is completed or not (a zero is assigned for missed tests/assignments). This mark will show on the student's transcript and will be calculated into their average.

## Course Grading Policies

### Submission of Assignments

All lab assignments should be submitted electronically via Gradescope (see CourseLink), unless otherwise indicated by the instructors.

### Grades and feedback

Unofficial assessment marks will be available in the Grades tool of the course website. The instructors will attempt to have assessment marks posted online within 2 weeks of the submission deadline, if the assignment was submitted on time. Once your assignments are marked, you can view your individual marks on the course website by selecting Grades from the Tools dropdown menu on the navbar. The course website will remain open to you for seven days following the last day of the final exam period. At the end of the term and after the final exam period has ended, as a University of Guelph student, you will be able to access your final course grade by logging into WebAdvisor (using your U of G central ID).

<https://webadvisor.uoguelph.ca>

### Grading Policies

Lab assignments are to be submitted to the instructors, via Crowdmark (see Section 6.4 of this course outline), on or before the due date at 11:59pm. Email submissions will not be accepted unless agreed upon ahead of time with the instructor. No late submissions will be accepted without medical or compassionate justification.

You should remember that a technical difficulty is not a valid excuse to turn in an assignment late. Don't wait until the last minute as you may get behind in your work. Be sure to keep a back-up copy of all your assignments: to avoid any last-minute computer problems, save your assignments to a cloud-based file storage (e.g., Google Docs, OneDrive) or send copies to your email account so that should something happen to your computer, your assignment can still be submitted on time or re-submitted.

## Standard Statements for Undergraduate Courses

### Academic Integrity

The University of Guelph is committed to upholding the highest standards of academic integrity and it is the responsibility of all members of the University community – faculty, staff, and students – to be aware of what constitutes academic misconduct and to do as much as possible to prevent

academic offences from occurring. University of Guelph students have the responsibility of abiding by the University's policy on academic misconduct regardless of their location of study; faculty, staff and students have the responsibility of supporting an environment that discourages misconduct. Students need to remain aware that instructors have access to and the right to use electronic and other means of detection.

Please note: Whether or not a student intended to commit academic misconduct is not relevant for a finding of guilt. Hurried or careless submission of assignments does not excuse students from responsibility for verifying the academic integrity of their work before submitting it. Students who are in any doubt as to whether an action on their part could be construed as an academic offence should consult with a faculty member or faculty advisor.

The Academic Misconduct Policy (<https://calendar.uoguelph.ca/undergraduate-calendar/undergraduate-degree-regulations-procedures/academic-misconduct/>) is outlined in the Undergraduate Calendar.

## Accessibility

The University promotes the full participation of students who experience disabilities in their academic programs. To that end, the provision of academic accommodation is a shared responsibility between the University and the student.

When accommodations are needed, the student is required to first register with Student Accessibility Services (SAS). Documentation to substantiate the existence of a disability is required; however, interim accommodations may be possible while that process is underway.

Accommodations are available for both permanent and temporary disabilities. It should be noted that common illnesses such as a cold or the flu do not constitute a disability. Use of the SAS Exam Centre requires students to make a booking at least 10 days in advance, and no later than the first business day in November, March or July as appropriate for the semester. Similarly, new or changed accommodations for online quizzes, tests and exams must be approved at least a week ahead of time. For students at the Guelph campus, information can be found on the SAS website. (<https://www.uoguelph.ca/sas/>)

## Accommodation of Religious Obligations

If you are unable to meet an in-course requirement due to religious obligations, please email the course instructor within two weeks of the start of the semester to make alternate arrangements.

See the Academic calendar for information on regulations and procedures for Academic Accommodations of Religious Obligations (<https://calendar.uoguelph.ca/undergraduate-calendar/undergraduate-degree-regulations-procedures/academic-accommodation-religious-obligations/>).

## Copies of Out-of-class Assignments

Keep paper and/or other reliable back-up copies of all out-of-class assignments: you may be asked to resubmit work at any time.

## Drop Date

Students will have until the last day of classes to drop courses without academic penalty. The deadline to drop two-semester courses will be the last day of classes in the second semester. This applies to all undergraduate students except for Doctor of Veterinary Medicine and Associate Diploma in Veterinary Technology (conventional and alternative delivery) students. The regulations and procedures for course registration are available in the Undergraduate Calendar - Dropping Courses (<https://calendar.uoguelph.ca/undergraduate-calendar/undergraduate-degree-regulations-procedures/dropping-courses/>).

## Email Communication

As per university regulations, all students are required to check their <uoguelph.ca> e-mail account regularly: e-mail is the official route of communication between the University and its students.

## Health and Wellbeing

The University of Guelph provides a wide range of health and wellbeing services at the Vaccarino Centre for Student Wellness (<https://wellness.uoguelph.ca/>). If you are concerned about your mental health and not sure where to start, connect with a Student Wellness Navigator (<https://wellness.uoguelph.ca/navigators/>) who can help develop a plan to manage and support your mental health or check out our mental wellbeing resources (<https://wellness.uoguelph.ca/shine-this-year/>). The Student Wellness team are here to help and welcome the opportunity to connect with you.

## Illness

Medical notes will not normally be required for singular instances of academic consideration, although students may be required to provide supporting documentation for multiple missed assessments or when involving a large part of a course (e.g., final exam or major assignment).

## **Recording of Materials**

Presentations that are made in relation to course work—including lectures—cannot be recorded or copied without the permission of the presenter, whether the instructor, a student, or guest lecturer. Material recorded with permission is restricted to use for that course unless further permission is granted.

## **Resources**

The Academic Calendars (<http://www.uoguelph.ca/registrar/calendars/?index>) are the source of information about the University of Guelph's procedures, policies and regulations which apply to undergraduate, graduate and diploma programs.

## **When You Cannot Meet a Course Requirement**

When you find yourself unable to meet an in-course requirement because of illness or compassionate reasons please advise the course instructor (or designated person, such as a teaching assistant) in writing, with your name, id#, and e-mail contact. See the Undergraduate Calendar for information on regulations and procedures for Academic Consideration. (<https://calendar.uoguelph.ca/undergraduate-calendar/undergraduate-degree-regulations-procedures/academic-consideration-appeals-petitions/>)