



ENVS*3050 Microclimatology

Winter 2019

Section(s): C01

School of Environmental Sciences

Credit Weight: 0.50

Version 1.00 - January 03, 2019

1 Course Details

1.1 Calendar Description

This course examines natural and intentionally-modified microclimates near the earth's surface; energy budgets; transport of mass and heat. Familiarization with some instruments for microclimatic measurements will be required.

Pre-Requisite(s): (1 of PHYS*1000, PHYS*1070, PHYS*1080, PHYS*1130), (1 of ENVS*2020, ENVS*2030, MET*2020, MET*2030, GEOG*2110)

Equate(s): MET*3050

1.2 Timetable

Mon, Wed, Fri
12:30 – 1:20 PM
MCKN Room 223

1.3 Final Exam

April 22 7:00-9:00 PM Room TBA

Exam time and location is subject to change. Please see WebAdvisor for the latest information.

2 Instructional Support

2.1 Instructional Support Team

Instructor: Claudia Wagner-Riddle
Email: cwagnerr@uoguelph.ca
Telephone: +1-519-824-4120 x52787

Office:	ALEX 110
Office Hours:	Mon and Fri 3:00-4:00 pm, Wed 10:00-11:00 am, or by appointment (contact via email).
Instructor:	Scott Krayenhoff
Email:	skrayenh@uoguelph.ca
Telephone:	+1-519-824-4120 x56868
Office:	ALEX (AXEL) 108
Office Hours:	Mon and Fri 3:00-4:00 pm, Wed 10:00-11:00 am, or by appointment (contact via email).

3 Learning Resources

3.1 Required Resource(s)

Oke, T.R. 1990. *Boundary layer climates*. Routledge, 435 pp. (QC 981.7.M5 O34) (on reserve) (Textbook)

3.2 Recommended Resource(s)

Bonan, G.B. 2002. *Ecological Climatology: concepts and applications*. Cambridge, 678 p. (QK754.5 .B66) (on reserve) (Textbook)

3.3 Additional Resource(s)

CourseLink (Website)

<http://courselink.uoguelph.ca>

Course handouts, slides and review/discussion questions will be posted on CourseLink as we progress through the course topics.

4 Learning Outcomes

4.1 Course Learning Outcomes

By the end of this course, you should be able to:

1. Identify and describe basic principles (e.g., energy budget and Ohm's law analogy) underlying mass and energy exchange in the environment
2. Apply and interpret these principles to specific microclimates (e.g., non-vegetated, vegetated surfaces)
3. Apply microclimatic principles to broad environmental issues (e.g., climate change)
4. Solve, interpret and communicate results of simple numerical models of microclimates
5. Use simple microclimatic instruments to characterize contrasting microclimates and relate results to microclimatic principles

5 Teaching and Learning Activities

5.1 Lecture

Topic(s):	Introduction: scales in Microclimatology. Fundamental concepts: modes of energy transfer. Review of radiation laws, and radiative properties of materials.
Textbook Readings:	p. 3-6, 8-17; 33-34
Topic(s):	Radiation, energy and mass balance; consumer vs. supplier and sign convention.
Textbook Readings:	p. 7, 20-32
Topic(s):	Profiles of temperature, and gases: spatial and temporal variability. Ohm's law analogy. Computer model for surface temperature: development and testing.
Textbook Readings:	p. 37-41, 69-71
Topic(s):	Wind speed profile and aerodynamic resistance; atmospheric surface layer: turbulence and sensible heat, latent heat and momentum flux; stability effects.
Textbook Readings:	p. 51-76
Topic(s):	Review for Mid-Term 1.
Topic(s):	Sub-surface climates: heat storage in the soil. Computer model: soil temperature wave
Textbook Readings:	p. 34-36, 46-48
Topic(s):	Microclimates of simple non-vegetated surfaces: snow.
Textbook Readings:	p. 84-98
Topic(s):	Microclimates of simple non-vegetated surfaces: water.
Textbook Readings:	p. 98-107
Topic(s):	Microclimates of vegetated surfaces: crops and forests. Ecosystem-atmosphere carbon exchange.
Textbook Readings:	p. 110-158
Topic(s):	Review for Mid-Term 2.
Topic(s):	Climates of Animals.
Textbook Readings:	

p. 190-197, 206-226

Topic(s): Human Comfort. Wind Chill Temperature. Review for Final Exam.

Handouts

6 Assessments

6.1 Marking Schemes & Distributions

Name	Scheme A (%)
Assignment 1	5
Assignment 2	5
Midterm Exam 1	15
Assignment 3	5
Assignment 4	5
Assignment 5	5
Midterm Exam 2	15
Final Exam	35
Microclimate Group Project	10
Total	100

6.2 Assessment Details

Assignment 1 (5%)

Date: Wed, Jan 23

Learning Outcome(s): 1

Assignment 2 (5%)

Date: Fri, Feb 1

Learning Outcome(s): 1,2,4

Midterm Exam 1 (15%)

Date: Fri, Feb 8

Learning Outcome(s): 1,2

Assignment 3 (5%)

Date: Fri, Mar 1

Learning Outcome(s): 2,4

Assignment 4 (5%)

Date: Fri, Mar 8

Learning Outcome(s): 1,2,3,4

Assignment 5 (5%)

Date: Fri, Mar 15

Learning Outcome(s): 1,2,3,4

Midterm Exam 2 (15%)

Date: Fri, Mar 22

Learning Outcome(s): 1,2,3,4

Final Exam (35%)

Date: Mon, Apr 22

Learning Outcome(s): 1,2,3,4

Cumulative

Microclimate Group Project (10%)

Date: See additional notes

Learning Outcome(s): 5

Please see CourseLink for instructions.

7 Course Statements

7.1 Grading Policies

Assignments are to be handed in MCKN room 223 at the start of class on the dates shown above. No late submissions will be accepted without medical or compassionate documentation.

7.2 Group Work Policy

Assignments must be completed individually. Components of the microclimatic measurement project and presentation are to be completed by all group members.

8 University Statements

8.1 Email Communication

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

8.2 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. The grounds for Academic Consideration are detailed in the Undergraduate and Graduate Calendars.

Undergraduate Calendar - Academic Consideration and Appeals

<https://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-ac.shtml>

Graduate Calendar - Grounds for Academic Consideration

<https://www.uoguelph.ca/registrar/calendars/graduate/current/genreg/index.shtml>

8.3 Drop Date

Courses that are one semester long must be dropped by the end of the fortieth class day; two-semester courses must be dropped by the last day of the add period in the second semester. The regulations and procedures for course registration are available in the Undergraduate and Graduate Calendars.

Undergraduate Calendar - Dropping Courses

<https://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-drop.shtml>

Graduate Calendar - Registration Changes

<https://www.uoguelph.ca/registrar/calendars/graduate/current/genreg/genreg-reg-regchg.shtml>

8.4 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.

8.5 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 book their exams at least 7 days in advance and not later than the 40th Class Day.

More information can be found on the SAS website

<https://www.uoguelph.ca/sas>

8.6 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 encourages academic integrity. 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.

Undergraduate Calendar - Academic Misconduct

<https://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-amisconduct.shtml>

Graduate Calendar - Academic Misconduct

<https://www.uoguelph.ca/registrar/calendars/graduate/current/genreg/index.shtml>

8.7 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.

8.8 Resources

The Academic Calendars are the source of information about the University of Guelph's procedures, policies, and regulations that apply to undergraduate, graduate, and diploma programs.

Academic Calendars

<https://www.uoguelph.ca/academics/calendars>
