

**ENVS\*3050 Microclimatology**

Winter 2018

Section(s): C01

Credit Weight: 0.50

Version 1.00 - January 04, 2018

# Course Details

## 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):

**Equate(s):**

* 1. **Timetable**

**Mon, Wed, Fri**

12:30 – 1:20 PM

MCKN Room 226

## Final Exam

**April 19** 8:30-10:30 AM

(1of PHYS\*1000, PHYS\*1070, PHYS\*1080, PHYS\*1130), (1of ENVS\*2020, ENVS\*2030, MET\*2020, MET\*2030, GEOG\*2110) MET\*3050

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

# Instructional Support

## Instructor(s)

### Claudia Wagner-Riddle Email:

**Telephone: Office:**

**Office Hours:**

cwagnerr@uoguelph.ca

+1-519-824-4120 x52787

ALEX 110

Mon and Fri 3:00-4:00 pm, Wed 10:00-11:00 am, or by appointment (contact via email).

# Learning Resources

## Required Resources(s)

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

* 1. **Recommended Resources(s)**

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

* 1. **Additional Resources(s)**

**CourseLink (Website)**

[http://courselink.uoguelph.ca](http://courselink.uoguelph.ca/)

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

# Learning Outcomes

## 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

# Teaching and Learning Activities

## Lecture

### Topic(s):

**Textbook Readings:**

p. 3-6, 8-17; 33-34

### Topic(s):

**Textbook Readings:**

p. 7, 20-32

Introduction: scales in Microclimatology. Fundamental concepts: modes of energy transfer. Review of radiation laws, and radiative properties of materials.

Radiation, energy and mass balance; consumer vs. supplier and sign convention.

### Topic(s):

**Textbook Readings:**

p. 37-41, 69-71

### Topic(s):

**Textbook Readings:**

p. 51-76

### Topic(s):

**Topic(s):**

**Textbook Readings:**

p. 34-36, 46-48

### Topic(s):

**Textbook Readings:**

p. 84-98

### Topic(s):

**Textbook Readings:**

p. 98-107

### Topic(s):

**Textbook Readings:**

p. 110-158

### Topic(s):

**Topic(s):**

**Textbook Readings:**

p. 190-197, 206-226

### Topic(s):

Handouts

Profiles of temperature, and gases: spatial and temporal variability. Ohm’s law analogy. Computer model for surface temperature: development and testing.

Wind speed profile and aerodynamic resistance; atmospheric surface layer: turbulence and sensible heat, latent heat and momentum flux; stability effects.

Review for Mid-Term 1.

Sub-surface climates: heat storage in the soil. Computer model: soil temperature wave

Microclimates of simple non-vegetated surfaces: snow.

Microclimates of simple non-vegetated surfaces: water.

Microclimates of vegetated surfaces: crops and forests. Ecosystem-atmosphere carbon exchange.

Review for Mid-Term 2. Climates of Animals.

Human Comfort. Wind Chill Temperature. Review for Final Exam.

# Assessments

## Marking Schemes & Distributions

|  |  |
| --- | --- |
| Name | Scheme A (%) |
| Assignment 1 | 5.00 |
| Assignment 2 | 5.00 |
| Midterm Exam 1 | 15.00 |
| Assignment 3 | 5.00 |
| Assignment 4 | 5.00 |

|  |  |
| --- | --- |
| Name | Scheme A (%) |
| Assignment 5 | 5.00 |
| Midterm Exam 2 | 15.00 |
| Final Exam | 35.00 |
| Microclimate Group Project | 10.00 |
| Total | 100.00 |

* 1. **Assessment Details**

**Assignment 1 (5.00%) Date:** Wed, Jan 24

**Assignment 2 (5.00%) Date:** Fri, Feb 2

**Midterm Exam 1 (15.00%) Date:** Fri, Feb 9

**Assignment 3 (5.00%) Date:** Fri, Mar 2

**Assignment 4 (5.00%) Date:** Fri, Mar 9

**Assignment 5 (5.00%) Date:** Fri, Mar 16

**Midterm Exam 2 (15.00%) Date:** Fri, Mar 23

**Final Exam (35.00%) Date:** Thu, Apr 19 Cumulative

**Microclimate Group Project (10.00%) Date:** See additional notes

Please see CourseLink for instructions.

# Course Statements

## Grading Policies

Assignments are to be handed in MCKN room 226 at the start of class on the dates shown above. No late submissions will be accepted without medical or compassionate documentation. Late assignments or projects will be assessed a penalty of 10% of the total available marks for that assignment per day (including weekends).

## Group Work Policy

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

# University Statements

## 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.

## 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 regulations and procedures for [Academic Consideration](https://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-ac.shtml) are detailed in the Undergraduate Calendar.

## 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 [Dropping Courses](https://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-drop.shtml) are available in the Undergraduate Calendar.

## 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.

## 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: [www.uoguelph.ca/sas](http://www.uoguelph.ca/sas)

## Academic Misconduct

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://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-amisconduct.shtml) is detailed in the Undergraduate Calendar.

## Recording of Materials

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

## Resources

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

## 8.8 Resources

The [Academic Calendars](https://www.uoguelph.ca/registrar/calendars/) are the source of information about the University of Guelph’s procedures, policies and regulations which apply to undergraduate, graduate and diploma programs.