UM | Faculty of Agricultural and Food Sciences

University of Manitoba
Faculty of Agricultural and Food Sciences

Course Title: Introduction to Agrometeorology **Course Number:** SOIL 3060 **Credit Hours:** 3
Department: Soil Science **Academic Session:** Fall 2020

Prerequisites and how they apply to this course: None
Class Location: Online **Class Hours**: Questions/Discussion, Wednesdays 10:30-11:20 a.m.
Class is offered asynchronously; students study narrated modules and complete assignments by given deadlines according to their own daily schedules.
Laboratory: none.
Department Office: 362 Ellis Bldg **Department Phone Number**: 204 474-8153
Course Web Page: UM Learn

Instructor Information

Name: Dr. Paul Bullock **Office Location**: 320 Ellis Bldg **Office Phone Number**: 204-474-8666
Office Hours: Instructor will be online via Webex on Wednesdays from 10:30 a.m. to 11:20 a.m. Other meetings can be arranged via email.
Email Address: Paul.Bullock@umanitoba.ca Note, you must email from your University of Manitoba account. Normal response time will be within 48 hours.
Grader: Kody Oleson **Email Address**: olesonk@myumanitoba.ca

Course Philosophy

Students' Learning Responsibilities

Students are expected to view the narrated slides for each module of each section and use them to learn the class material and to complete the assignments. The slides are available on the UM Learn course page at the start of the class. Students are also expected to supplement the slides with their own notes from the narration included with the slides.

Review questions are provided at the end of each module to assist students with testing their knowledge of course material. Students are expected to study the review questions on their own and seek clarification prior to quizzes and the final exam on any material that they do not fully understand.

Why this course is useful?

The course provides the opportunity to more fully understand the impact of weather and climate on agriculture as well as more generally its day-to-day effects on people. This knowledge is fundamental to understanding the effects of environment on agricultural practices, decision-making, and outcomes as well as the potential impact of climate change on food production.

Who should take this course?

The course is designed to benefit students with a wide background of knowledge. It does not require university prerequisites. Persons studying agriculture, agroecology, environmental science, applied atmospheric sciences, or geography will benefit from an improved understanding of weather effects on the biosphere as covered by this course. Everyone can benefit from a greater understanding of the fundamental manner in which weather affects everyday life. This course specifically looks at climate change and its potential consequences for agriculture. Students who already have an understanding of weather and climate will find the first sections of the course to be a review of their prior knowledge.

How this course fits into the curriculum

SOIL 3060 is a restricted elective in the Agronomy and Agroecology programs in the Faculty of Agricultural and Food Sciences. It is an eligible course towards the Minor in Soil Science.

Course Description

Undergraduate Calendar Description

Basic description and discussion of properties of the atmosphere, radiation, temperature, effect of temperature on plant growth, climate and animal response, water, evapotranspiration, insect adaptation, activity in relation to climate, climatic data.

Instructional Methods

The learning process will be facilitated with narrated slides divided into sections and modules with given dates to commence and finish each section. The students will also complete assignments as well as a term project designed to apply the knowledge from the course material. Wednesdays from 10:30 a.m. to 11:20 a.m. will be reserved for an optional live question/discussion period with the instructor via webex.

Course Objectives and Learning Outcomes

The course is designed to enable students to develop the following agrometeorological knowledge:

1. understand basic concepts of energy and mass transfer in the Earth's atmosphere,
2. recognize the types and basic principles of common instruments used to characterize weather,
3. understand the climatic variation that exists across Western Canada's crop-growing region
4. apply agrometeorological principles to solve basic problems that quantify weather and climate impacts on agriculture,
5. interpret common measures used to assess the impact of specific weather conditions on crops, insects, pathogens and livestock.

Description of Quizzes and Final Exam

There will be 2 online quizzes during the course. The first quiz will cover material from the first 3 sections of the course and the second quiz will cover material from the last 3 sections of the course. Each quiz will be worth 10% of the final grade. Quizzes will be available online through UM Learn. Quiz 1 will be available from 8:00 a.m. to 8:00 p.m. on October 22 and Quiz 2 will be available from 8:00 a.m. to 8:00 p.m. on December 11. Each quiz will contain a set of 30 multiple choice questions (10 questions per section covered by the quiz). The 10 questions from each section will be drawn randomly from a pool of questions, so each student will write a different quiz. There will be a 45-minute time limit for the quiz and the grade will be provided immediately upon completion. Each student will be allowed an optional 2nd attempt for each quiz within the time periods above. Since the questions are drawn randomly, the questions on the 2nd attempt may be completely different from those on the first attempt. If a student decides to take the optional 2nd attempt on either quiz, the final mark on the quiz will be that from the 2nd attempt.

The final exam will be scheduled during the December exam period and will be a 2-hour open-book format.

Description of Assignments

There are 7 assignments, which are problem-solving exercises. They will be posted on the UM Learn course page and are due for submission to UM Learn page 1 week later. They will be graded within a week after submission

A term project will be assigned in September. Each student will work with their own unique weather dataset to be used for analysis as part of the assignments above. When the students have completed all of the analyses, they will write an interpretive report. The term project is due Monday **December 7, 2020** at 4:30 p.m.

Grade Evaluation
Assignments–25%, Term Project–20%, Quizzes–20%, Final Exam–35%

Letter Grade Equivalency:
A+(>/=90%); A(80-89%); B+(75-79%); B(70-74%); C+(65-69%); C(60-64%); D(50-59%); F(<50%)

Important Dates for this course

Sep 9, 2020:	First Wednesday Webex Online session
Nov 9-13, 2020:	Fall Break (no assignments or Webex Online session)
Nov. 23, 2020:	Voluntary Withdrawal date:
Dec. 11, 2020:	Last Day of Classes

Texts, Readings, Materials

Textbook(s) – Authors, Titles, Edition

No textbook is required. The narrated slides on UM Learn constitute the study material for the class. General supporting information on atmospheric science is available on the internet.

Course Policies

Late and Missed Assignments

Assignments must be submitted on the due date and time in order to accommodate timely feedback of grades and comments. If students know beforehand that they will not be able to submit an assignment on the due date, they should either submit the assignment early or contact the instructor to make alternate arrangements. Penalties for late submission of Assignments and the Term Project Paper are 10% per day late (i.e., a submission that is 10 days late will be marked as zero). Assignments submitted after those from the other students have been corrected and returned will receive a grade of zero.

Missed Exams

Students who miss the final exam will receive a grade of "Incomplete – Fail" on the course.

Medical Notes

Students who are unable to meet a course requirement due to medical circumstances are currently not required to submit medical notes. However, students are required to contact their instructor or academic advisor by email to inform of the missed work and to make arrangements for extensions, deferrals, or make-up assignments. If you are unable to meet an academic requirement for this course:

- Contact the instructor as soon as possible for a missed assignment, quiz or term project;
- Contact your faculty advisor for a missed final exam (Note for final exams, students must make contact within 48 hours of the date of the final exam); and
- Make contact from your U of M email address, and include your full name, student number, course number, and academic work that was missed.

Academic Integrity

Academic integrity helps all of us by:

- improving the quality and long-term value of learning
- maintaining a good reputation and public confidence in individual students and graduates, as well as our staff, our Faculty, our university, and our profession.

The University of Manitoba regards acts of academic misconduct in quizzes, tests, examinations, laboratory reports or assignments as serious offences and may assess a variety of penalties depending on the nature of the offence. Penalties range from a grade of zero for the assignment or examination, failure in the course, to expulsion from the University. Examples of misconduct include, but are not limited to:

a) Plagiarism – the presentation or use of information, ideas, sentences, findings, etc. as one's own without appropriate attribution in an assignment, test or final examination.
b) Cheating on quizzes, tests or final examinations – the circumventing of fair testing procedures or contravention of exam regulations. Such acts may be premeditated/planned or may be unintentional or opportunistic.
c) Inappropriate collaboration – when a student and any other person work together on assignments, projects, tests, labs or other work unless authorized by the course instructor.
d) Duplicate submission – cheating where a student submits a paper/assignment/test in full or in part, for more than one course without the permission of the course instructor.
e) Personation – writing an assignment, lab, test, or examination for another student, or the unauthorized use of another person's signature or identification in order to impersonate someone else. Personation includes both the personator and the person initiating the personation.
f) Academic fraud – falsification of data or official documents as well as the falsification of medical or compassionate circumstances/documentation to gain accommodations to complete assignments, tests or examinations

If you have any questions about how to make sure that you're complying with the University's expectations for academic integrity in this course, please contact the instructor for this course.

For more information about the U of M's commitment to academic integrity, go to: http://umanitoba.ca/student-supports/academic-supports/academic-integrity.

For more information about the U of M's Student Discipline By-Law, go to: http://crscalprod.ad.umanitoba.ca/Catalog/ViewCatalog.aspx?pageid=viewcatalog&catalogid=440&chapterid=5113&topicgroupid=27390&loaduseredits=False.

Other student resources, including student accessibility services, writing and learning support, library information, academic advisory services, student advocacy, and policies regarding student discipline, intellectual property and reporting sexual assaults, please see Schedule A - Policies and Resources for Students posted on this course's UM Learn website.

Course Content

Section	Modules	Progression Dates
1. Earth's Atmosphere	1.1 Properties of the Earth's Atmosphere	Commence Sep 10
	1.2 Atmospheric Wind and Clouds	
	1.3 Weather Observation I	
	1.4 Weather Observation II	
	1.5 Weather and Climate Data	
	1.6 The Prairie Climate	Complete by Sep 21
2. Energy Transfer	2.1 Energy Transfer Mechanisms	Commence Sep 22
	2.2 Solar Radiation	
	2.3 The Earth's Greenhouse Effect	
	2.4 Local Energy Flux	
	2.5 Net Radiation Partitioning	
	2.6 Radiation Measurement	Complete by Oct 1
3. Water Cycling	3.1 Atmospheric Water	Commence Oct 2
	3.2 Measures of Atmospheric Water	
	3.3 Precipitation Mechanisms and Measurement	
	3.4 The Water Balance and Evapotranspiration Flux	
	3.5 Evapotranspiration Measurement	
	3.6 Evapotranspiration Estimation	
	3.7 Soil Moisture	
	3.8 Soil Moisture Measurement	
	3.9 Drought	Complete by Oct 20
		QUIZ 1 on Oct 22
4. Weather and Crops	4.1 Frost-free Period	Commence Oct 21
	4.2 Growing Degree Days	
	4.3 Crop Heat Units	
	4.4 P-Days/Photoperiod Response	
	4.5 Solar Radiation Interception	
	4.6 Crop Interception of Solar Radiation	
	4.7 Crop Water Use	
	4.7 Water Impacts on Biomass Production	
	4.8 Crop Yield Estimation with Weather Data	
	4.9 Crop Yield Estimation with Satellite Data	
	4.10 Operational Crop Yield Estimation Systems	Complete by Nov 6
5. Weather Impacts on Animals and Pests	5.1 Weather Impacts on Animals	Commence Nov 16
	5.2 Weather Impacts on Insects	
	5.3 Weather Impacts on Weeds	
	5.4 Weather-based Pathogen Models 1	
	5.5 Weather-based Pathogen Models 2	
	5.6 Shelterbelts	
	5.7 Weather and Fire	Complete by Nov 25
6. Climate and Agriculture	6.1 Governmental Response to Climate Change	Commence Nov 26
	6.2 Recent Climate Change	
	6.3 Climate Change Drivers	
	6.4 Future Climate Change	
	6.5 Greenhouse Gas Emissions	
	6.6 Climate Change Mitigation	
	6.7 Greenhouse Gas Reduction in Agriculture	
	6.8 Climate Change Impacts on Agriculture	
	6.9 Climate Change Adaptation in Prairie Agriculture	Complete by Dec 9
		Quiz 2 on Dec 11