GEOG 1201(3)-002
Introductory Atmospheric Science
Winter Term 2022 (Jan to Apr)

Course Instructor: Danny Blair
Office: 5L33 Phone: (204) 786-9236

Lecture Format: By Zoom; synchronous (live, not recorded) (at least first half of course)
Lecture Schedule: Tuesdays and Thursdays, 10:00 – 11:15 am
Office Hours: Please make an appointment; usually Tue/Thu 8:30 – 9:30 am

Email: d.blair@uwinnipeg.ca

Lab Coordinator: Jay Maillet Email: j.maillet@uwinnipeg.ca
Lab Instructors: Patrick Harney Email: harney-p@webmail.uwinnipeg.ca
Patrick Carty Email: carty-p@webmail.uwinnipeg.ca
Haven Soto Email: soto-h@webmail.uwinnipeg.ca

Lecture Format:
- The lectures will be taught online, by Zoom, live, at the scheduled lecture times
- Invitations to Zoom meetings will be sent to your University of Winnipeg email address

Possible Return to In-Person Instruction:
- If the University deems it safe to do so, this course will convert to in-person, on-campus instruction after the mid-term Reading Week.
- Therefore, students registered in this course must be able to attend in person classes after the mid-term Reading Week.

Lab Format:
- Lab Section 074: Mondays, 10:30 am – 12:20 pm; online by Zoom, synchronous (live)
- Lab Section 075: This lab is online, asynchronous (recorded)
- Lab Section 076: Wednesday, 8:30 – 10:20 am; online by Zoom, synchronous (live)
- Lab Section 077: Wednesday, 1:30 – 3:20 pm; online by Zoom, synchronous (live)

Labs in the course begin the **week of January 10.**

Lab Nexus: Materials for synchronous labs (sections 074, 076, 077) are posted on a separate Nexus site. Section 075 is delivered online asynchronous and has a dedicated Nexus.

Note: If you are enrolled in a synchronous lab, you should have access to the "Lab for Intro Atmospheric Science" Nexus. If you are enrolled in the asynchronous lab section, you should have access to the "Online Lab for Intro Atmospheric Science" Nexus. Everyone should have access to the course Nexus. Alert the instructor if this is not the case.

Textbook (Recommended):

Geosystems: An Introduction to Physical Geography
Updated 4th Canadian edition, e-book
R.W. Christopherson, G.H. Birkeland, M.-L. Byrne, and P.T. Giles (2019)
Pearson Education, Inc. ISBN 978-0-13-340552-1.

Textbook Website:
https://www.pearson.com/store/p/geosystems-an-introduction-to-physical-geography-updated-fourth-canadian-edition/P100002992950.

Nexus Site for Lectures:
The slide presentations used in lectures will be posted on Nexus (https://nexus.uwinnipeg.ca/). Reading lists, useful links, and supplementary material will be posted as well.

If you are having difficulties with Nexus contact the help desk at (204) 786-9149 or help.desk@uwinnipeg.ca.

How to Contact Professor Blair:
Use your University of Winnipeg email address for course-related correspondence (name@webmail.uwinnipeg.ca). **Do not use the Nexus email function**. Please do not use your gmail or hotmail (or whatever) accounts to correspond with the instructor; these usually get blocked by our spam filter. When contacting the instructor, please make sure you use a proper subject heading for the email (e.g. Introductory Atmospheric Science question). The instructor will make every attempt to respond promptly except on weekends. The instructor will use your University of Winnipeg email to contact you, when necessary.

Students have the responsibility to regularly check their University of Winnipeg e-mail addresses to ensure timely receipt of correspondence from the University and/or their course instructors.

Course Description:
This course is an introduction to the atmospheric sciences of climatology and meteorology. The introduction to climatology examines how and why average atmospheric conditions (i.e., climates) vary from place to place and over time (e.g., over months, years, centuries). The introduction to meteorology surveys the nature of the atmosphere and the causes and characteristics of short-term atmospheric conditions (i.e., weather). Methods of collecting and analyzing climate and weather data are reviewed, as are the ways in which atmospheric processes interact with other components of the ecosphere (e.g., the biosphere, lithosphere, hydrosphere, humans).

Learning Outcomes:
By the end of this course students should be able to describe or explain and better understand:

- the primary elements that make up the atmosphere
- the vertical structure of the atmosphere
- the nature of electromagnetic radiation and the other forms of energy important in the climate system
- the factors affecting incoming solar radiation and outgoing terrestrial radiation
- the components and characteristics of Earth's energy balance
- the factors that determine the daily and seasonal cycles of temperature
- the forces of motion that produce winds in the lower and upper atmosphere and currents in the oceans
- Earth's average pressure, wind, temperature and precipitations patterns
- the processes related to cloud and precipitation formation
- the basic methods and tools involved in weather monitoring and forecasting
- the characteristics of Earth's hydrological cycle
- the characteristics of cyclones, anticyclones, air masses and fronts
- the basic characteristics of thunderstorms and hurricanes
- the causes and characteristics of Earth's general circulation
- the causes and characteristics of Earth's various climates
- the basic causes of climate change, in the past and currently

Student Evaluation:

LAB ASSIGNMENTS	20%	LAB DUE DATES: as indicated by the lab instructor. Late submissions will not be accepted for grading (except in unavoidable circumstances). A grade of "zero" will be recorded for late assignment submissions.
MIDTERM TEST	20%	Tuesday, March 1, 2022 (10:00 – 11:15 am)
FINAL LAB EXAM	20%	Thursday, April 7, 2022
FINAL EXAM	40%	TBA; Final exams held April 8-22; date will be reported here: https://www.uwinnipeg.ca/exam-schedules/

Grading

A+ = 90% and up	B+ = 75-79.9	C+ = 65-69.9	D = 50-54.9
A = 83-89.9	B = 70-74.9	C = 55-64.9	F= 49.9 and below
A- = 80-82.9			

The numeric boundaries separating letter grades may be altered at the demand of the Departmental Review Committee. Grades are not final until approved by the University Senate. **WEDNESDAY MARCH 16TH is the FINAL DATE to withdraw without academic penalty. Withdrawing before the VW date does not necessarily result in a fee refund.**

Important Dates:

Date	Importance
Thu Jan 6	First lecture in this course
Week of Jan 10	Labs begin
Feb 20-26	No Classes; Mid-term Reading Week
Mon Feb 21	Louis Riel Day: University Closed
Tue Mar 1	Midterm Exam
Wed Mar 16	Last Day to Withdraw Without Academic Penalty*
Tue Apr 5	Last lecture in this course
Thu Apr 7	Final Lab Exam (Time TBA)
Date and Time TBA	Final Exam

*** Voluntary Withdrawal:** You must formally withdraw from a course. If you simply stop going to classes, you may receive an "F" on your transcript and loss of tuition credit. Please refer to the 2021-2022 Undergraduate Academic Calendar for Voluntary Withdrawal procedures. Please note that withdrawing before the Voluntary Withdrawal date does not result in fee refund.

Should it be necessary to cancel a class due to exceptional circumstances, the instructor will make every effort to inform students via UWinnipeg email.

Alternate exam dates will be considered in very exceptional cases and for legitimate reasons only; vacation travel is not an acceptable reason. If you miss an exam, you must contact your instructor as soon as possible to determine if an alternate exam is warranted. Documentation (i.e., proof of illness or circumstances beyond your control) is required before alternate arrangements can be made.

The Final Exam must be written as scheduled in the 2021-2022 Exam Timetable. If you have a Final Exam conflict (i.e., two final exams on the same date and time), or if circumstances beyond your control prevent you from writing the exam as scheduled, you must contact Academic Advising immediately; otherwise, you must write the final exam as scheduled. Please refer to

Section 9.d. under REGULATIONS & POLICIES in the 2021-2022 Undergraduate Academic Calendar for information about deferred exams and incomplete work.

Course Organization:
The following outlines the topics to be discussed during lectures. The order of the presentations is subject to change as circumstances dictate. The **instructor will provide ongoing updates about what topics will be covered and when**.

Please note that due to time constraints, or conditions beyond the instructor's control, all topics may not be covered.

Order	General Topics	Some of the Specific Topics	Primary Readings
1	Introduction to course, geography	Course outline, grading, regulations, expectations, physical geography as a discipline	
2	Earth size/shape, location and time	Polar/equatorial distances, oblate ellipsoid, latitude, longitude, geographic zones, great/small circles, time and time zones, prime meridian,	Chapter 1
3	The atmosphere	Atmospheric composition and structure, concepts of temperature/pressure/density, temperature profile, lapse rates, functional layers	Chapter 3 Chapter 5
4	Earth-sun relationships	The seasons, revolution, rotation, tilt, axial parallelism, sphericity, aphelion, perihelion, solstices/equinoxes, declination, subsolar point, sun diagrams, ice cores, Milankovic cycles	Chapter 2
5	Radiation and energy balances	Energy, electromagnetic radiation, solar/terrestrial radiation, solar constant, shortwave vs longwave, insolation, transmission, absorption, emission, reflection, scattering, Wien's Law, Stefan-Boltzmann Law, net radiation, conduction, convection, latent heat, energy balance, greenhouse effect, surface energy balance	Chapter 2 Chapter 4
6	Global temperatures	Temperature controls, land-water contrasts, maritime-continental effects, temperature patterns, wind chill, isotherms,	Chapter 5
7	Water and humidity	Water on earth, hydrologic cycle, evapotranspiration, water budgets, unique properties of water, humidity, saturation, relative humidity, specific humidity, dew-point temperature, vapour pressure, measurement	Chapter 9 Chapter 7
8	Stability, clouds and precipitation	Stability, instability, adiabatic processes, dry/wet adiabatic rates, lifting condensation level, types of cloud, classification of clouds	Chapter 7
9	Pressure patterns, winds and ocean currents	Pressure gradient force, Coriolis force, friction, wind measurement, cyclones, anticyclones, global pressure patterns, thermal vs dynamic patterns, general circulation, ITCZ, equatorial trough, subtropical high pressure belt, Hadley cell, trade winds, westerlies, jet streams, Rossby waves, local winds, monsoons, ocean currents, thermohaline circulation	Chapter 6
10	Air masses and weather systems	Air masses, lifting mechanisms, cod and warm fronts, occlusions, cyclogenesis, storm tracks, upper-level convergence and divergence, weather maps	Chapter 8
11	Precipitation and extreme weather	Condensation nuclei, formation and measurement of precipitation, types of precipitation, thunderstorms, tornadoes, hurricanes	Chapter 8
12	Climate variability and change	El Niño Southern Oscillation (ENSO), PDO, NAO, AO, causes of climate change, global warming	Chapter 6 Chapter 11

OTHER INFORMATION

Students are expected to conduct themselves according to the standards and regulations set out by the University of Winnipeg. The University Senate would like you to be particularly aware of the following regulations appearing in the 2021-2022 Undergraduate Academic Calendar under **REGULATIONS & POLICIES**: **Grading** (Section 4)**; Grade Appeals** (Section 10), and; **Student Discipline** (Section 8), especially the definitions of **plagiarism** (Section 8.a.i) and **cheating** (Section 8.a.ii.).

ACADEMIC CONDUCT:
It is your responsibility to be familiar with the information on Academic Regulations and Policies listed in the 2021-22 University of Winnipeg Undergraduate Academic Calendar www.uwinnipeg.ca/index/calendar-calendar. This section covers classroom regulations, grading, transcripts, challenge for credit, academic standing, student discipline (academic and non-academic misconduct), appeals including grade appeals, general university policies and codes, and graduation. You can find information on plagiarism by watching the University of Winnipeg library video tutorial "Avoiding Plagiarism": https://www.youtube.com/watch?v=UvFdxRU9a8g

A summary of important information regarding Academic Misconduct follows. Where discrepancies exist between the text below and the Undergraduate Academic Calendar, the Undergraduate Academic Calendar will prevail.

Forms of Academic Misconduct:

- Plagiarism: includes presenting other people's published or unpublished work in part or as a whole as your own. This includes material from lab manuals, essays, journal articles, books, etc. Plagiarism also refers to submitting the same work in more than one course without both instructors' permission and to the situation where two or more students submit identical (or nearly identical) work for evaluation when the work was to be completed individually.
- Cheating: includes copying another person's answer on a test, communicating with another person during a test or exam, consulting unauthorized sources (including written and electronic sources), obtaining a copy (of all or part) of a test/exam/assignment before it is officially available, purchasing tests, essays or other assignments and submitting the work as your own.
- Improper Academic/Research practices include: fabricating or falsifying results, using other peoples' research findings without permission, misrepresenting research results or methods, referring to non-existent sources or investigators, contravening the University's Policy and Procedures on Research Integrity.
- Obstructing academic activities of another person; for example, interfering with another person's access to pertinent resources or information to gain academic advantage.
- Impersonation: both impersonation of another individual or allowing someone to impersonate you.
- Falsification or Modification of an Academic Record: including tests, transcripts, letters of permission, etc.
- Aiding and Abetting Academic Misconduct.

Penalties for Academic Misconduct:
Penalties for academic misconduct include, but are not limited to:

- Written warning
- Lower or failing grade on an assignment or test
- Lower or failing grade in a course
- Denial of admission or readmission to the University
- Forfeiture of University awards or financial assistance
- Suspension from the University for a specified period of time
- Withholding or rescinding a U of W degree, certificate or diploma

- Expulsion from the University

Procedures for Academic Misconduct:
All allegations of academic misconduct must be reported initiating a process which involves several steps. These include procedures involving the instructor of the course in which the misconduct is alleged to have occurred, the Departmental Review Committee, and the Senate Academic Misconduct Committee. Students facing a charge of academic or non-academic misconduct may choose to contact the UWSA Student Advocacy Centre where Student advocates will be available to answer any questions about the process, help with building a case and ensuring students have access to representation. For more information or to schedule an appointment, visit https://theuwsa.ca/academic-advocacy/ or call 204-786-9780.

Academic Misconduct Policy and Procedures:
https://www.uwinnipeg.ca/institutional-analysis/docs/policies/academic-misconduct-policy.pdf and https://www.uwinnipeg.ca/institutional-analysis/docs/policies/academic-misconduct-procedures.pdf

Non-Academic Misconduct Policy and Procedures:
https://www.uwinnipeg.ca/institutional-analysis/docs/student-non-academic-misconduct-policy.pdf and https://www.uwinnipeg.ca/institutional-analysis/docs/student-non-academic-misconduct-procedures.pdf

Misuse of Filesharing Sites:
Uploading essays and other assignments to essay vendor or trader sites (filesharing sites that are known providers of essays for use by others who submit them to instructors as their own work) involves “aiding and abetting” plagiarism. Students who do this can be charged with Academic Misconduct.

Avoiding Copyright Violation:
Course materials are owned by the instructor who developed them. Examples of such materials are course outlines, assignment descriptions, lecture notes, test questions, videos, and presentation slides. Students who upload these materials to filesharing sites, or in any other way share these materials with others outside the class without prior permission of the instructor/presenter, are in violation of copyright law and University policy. Students must also seek prior permission of the instructor /presenter before photographing or recording slides, presentations, lectures, and notes on the board.

RESEARCH ETHICS:
Students conducting research interviews, focus groups, surveys, or any other method of collecting data from any person, including a family member, must obtain research ethics approval before commencing data collection. Exceptions are research activities done in class as a learning exercise. For submission requirements and deadlines, see http://www.uwinnipeg.ca/research/human-ethics.html

ACCESIBILITY SERVICES:

Students with documented disabilities, temporary or chronic conditions requiring academic accommodations for tests/exams (e.g., private space) or during lectures/laboratories (e.g., access to volunteer note-takers), are encouraged to contact Accessibility Services (AS) at 204-786-9771, or accessibilityservices@uwinnipeg.ca to discuss appropriate options. All information about a student’s disability or medical condition remains confidential.

INDIGENOUS STUDENT SERVICES:
Indigenous students seeking additional supports, academic or other, are encouraged to contact the Aboriginal Student Services Centre (ASSC). The ASSC offers a variety of support services, and was created to maintain a safe, educational and culturally sensitive environment for all

Aboriginal students (First Nation, Metis and Inuit) as they pursue their academic studies at The University of Winnipeg. More information can be found at: http://www.uwinnipeg.ca/assc/.

SCENT-FREE ENVIRONMENT:
The University of Winnipeg promotes a scent-free environment. Please be respectful of the needs of fellow classmates and the instructors by avoiding the use of scented products while attending lectures and labs. Exposure to perfumes and other scented products (such as lotion) can trigger serious health reactions in persons with asthma, allergies, migraines or chemical sensitivities.

ACADEMIC ACCOMODATION FOR RELIGIOUS REASONS:
Students may choose not to attend classes or write examinations on holy days of their religion, but they must notify their instructors at least two weeks in advance. Instructors will then provide an opportunity for students to make up work or examinations without penalty. A list of religious holidays can be found at http://uwinnipeg.ca/academics/calendar/docs/important-notes.pdf

STUDENT WELLNESS:
The University of Winnipeg provides comprehensive general and specialized counselling and health services to all students for free at the Wellness Centre, located on the first floor of the Duckworth Centre (1D25). For more information see https://www.uwinnipeg.ca/student-wellness/

UW SAFE:
In the event of an emergency, please dial police at 911 or campus security at 204-786-6666 for help. Everyone is urged to download UW Safe, our new campus safety app for mobile devices (through the Apple or Google Play app store). It has emergency contact numbers ready to go with one click. It also contains a "friend walk" option that allows you to be visible in real time as you walk to a destination. SafeRide and SafeWalk programs are also available to everyone on campus including evening hours.
The University of Winnipeg has, in addition to the Respectful Working Environment Policy described below, policies and practices related to sexual violence. These are accessible here: https://www.uwinnipeg.ca/respect/sexual-violence/index.html. If you have experienced sexual violence, here are some important support telephone numbers:

- University Sexual Violence Response Line: 204-230-6660
- Klinic Sexual Assault Crisis Program 204-786-8631 or 204-784-4049 (also available after business hours)
- At Health Science Centre: 204-HSC 787-2071, ask for the sexual assault Nurse examiner (also available after business hours)

RESPECTFUL WORKING ENVIRONMENT:
All students, faculty and staff have the right to participate, learn, and work in an environment that is free of harassment and discrimination. The UW Respectful Working and Learning Environment Policy may be found online at www.uwinnipeg.ca/respect

PRIVACY:
Students should be reminded of their rights in relation to the collecting of personal data by the University (https://www.uwinnipeg.ca/privacy/admissions-privacy-notice.html), especially if Zoom is being used for remote teaching (https://www.uwinnipeg.ca/privacy/zoom-privacy-notice.html) and testing/proctoring (https://www.uwinnipeg.ca/privacy/zoom-test-and-exam-proctoring.html).

CLASS CANCELLATIONS:
When it is necessary to cancel a class due to exceptional circumstances, I will make every effort to inform students via UWinnipeg email (and/or using the preferred form of communication, as designated in this outline), as well as the Departmental Assistant and Chair/Dean so that class cancellation forms can be posted outside classrooms.

CHANGE TO FORMAT OF COURSE?
It is possible that health and safety concerns related to COVID-19 may necessitate the course going online (Zoom). Should this happen, every effort will be made to minimize the disruption to the content and quality of the course and to accommodate the needs of the students.

Notice Regarding Remote Test and Exam Proctoring

Tests/exams are proctored through a live Zoom meeting and may also be recorded locally for later review. Proctors will be monitoring for any evidence of academic dishonesty. Each proctor will monitor a small group of students simultaneously. Students must sit and face an engaged camera to enable monitoring. Microphones can be muted. After being reviewed for academic dishonesty, any recordings made will be promptly deleted if no such evidence is found.

As part of this monitoring, please note:

- Each student's name and everything within their camera's view, including their face, body, and background, will be visible to the proctor and to the other students within the group.
- If a student uses the chat feature, anything written will be visible to all meeting participants.
- If a student chooses to un-mute their microphone, anything said will be heard by all meeting participants.

Zoom has been configured to disable students from recording the test/exam. Information regarding Zoom's data collection, including a link to its privacy policy, can be found at https://www.uwinnipeg.ca/privacy/zoom-privacy-notice.html.

Student personal information is collected under the University of Winnipeg Act and 36(1)(b) of the Freedom of Information and Protection of Privacy Act. For information regarding privacy at UWinnipeg, contact Dan Elves, Senior Information and Privacy Officer, at da.elves@uwinnipeg.ca or 204.988.7538.