

DEPARTMENT OF ENVIRONMENT & GEOGRAPHY – COURSE OUTLINE

GEOG 3310 Atmospheric Dynamics, Storms and Radar (Winter 2016) (3-Credit Hours)

Instructor:

Name: Dr. John Hanesiak
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Email: john.hanesiak@gmail.com
Lectures: Tue. and Thur. at 11:30 - 12:45 AM in 245 Wallace
Office Hours: for 1 hour after class or by appointment

Textbook:

Stull, Roland B., Meteorology for Scientists and Engineers. 3rd ed., c2015.
(found here for free: http://www.eos.ubc.ca/books/Practical_Meteorology/)

Stull, Roland B., Meteorology for Scientists and Engineers. 2nd ed. Pacific Grove, CA: Brooks/Cole, c2000.

Tools:

All students should ensure they have non-programmable scientific calculators.

References:

Mid-latitude Synoptic Meteorology: Dynamics, Analysis & Forecasting (by Gary Lackmann)
Mesoscale Meteorology in Midlatitudes by P. Markowski and Y. Richardson (2010), Wiley Blackwell, 407 pp.
Holton, James R., An introduction to dynamic meteorology, 3rd edition, Academic Press, c1992.
Rinehart, R., Radar for Meteorologists 3rd edition, Rinehart Publications, Columbia, MO, USA.
Battan, Louis J. Radar observation of the atmosphere. Rev. ed. Chicago: University of Chicago Press, 1973.
Doviak, R. J. Doppler radar and weather observations. Orlando, Fla.: Academic Press, c1984.
Weather and weather maps: a volume dedicated to the memory of Tor Bergeron (15.8.1891-13.6.1977). Basel; Boston: Birkhauser Verlag, 1981.
Bluestein, Howard B. Synoptic-dynamic meteorology in midlatitudes. Volume 1. New York: Oxford University Press, 1992-1993.
Bluestein, Howard B. Synoptic-dynamic meteorology in midlatitudes. Volume 2. New York: Oxford University Press 1992.
Fundamentals of atmospheric physics by Murry L. Salby, Academic Press, 1996.
Fundamentals of atmospheric modeling by Mark Z. Jacobson, University Press, 1999.

Course Description and Objectives

The science of meteorology is founded upon the observation, description, and explanation of the physical properties of the Earth's atmosphere. The goal of this science is to explain and predict the weather and various critical atmospheric elements (e.g temperature, precipitation, wind, humidity and clouds). The purpose of the course is to provide students with an understanding of **dynamic** meteorological processes over synoptic and meso scales that contribute to general circulations, cyclonic systems, fronts and meso-scale convective storms. This will include Chapters 9-13 & 15 in the course text (2nd ed. of Stull) or

Chapters 10-14 and 17 (3rd ed. of Stull), as well as powerpoint notes and handouts that will cover Topics 5 & 6 below in greater detail than the text. Reference to Canadian weather (atmosphere and surface) will be made throughout the course. Students should be prepared for mathematical/physical concepts to be treated in the course.

Term Work and Allocation of Marks

- Three (3) term assignments (10% each) = 30%
- Mid-term exam = 20%
- Report = 30%
- Final Test = 20%

The due dates and details of the assignments will be provided in class. It will be important to attend the lectures and interact with myself and other students. Students will not be permitted to write make-up tests or hand in late assignments except for documented medical or compassionate reasons. A grade of zero will be recorded for missed tests and exams. Late assignments will be penalized 10% per day (including weekends and holidays). The final date for voluntary withdraw from this course is March 18, 2016. Students may have access to their marks prior to this date and are encouraged to talk with me before a decision to withdraw is made.

Course Outline

Section	Topic
1	Forces that Control Wind, Wind Types, Conservation Principles, Intro to Local Winds, Thermal Wind, Jet Stream, Convergence/Divergence, Vorticity
2	General Circulation, Rossby Waves, Barotropic & Baroclinic Instability, Large Scale Pressure Patterns
3	Fronts, Frontogenesis, Cyclones & Cyclogenesis, Large-Scale Vertical Motions, Quasi-Geostrophic approximations
4	Hodographs
5	Thunderstorms & Severe Convective Storms
6	Weather (Doppler) Radar

An assigned grade will correspond to the following range in marks:

A+	90% and over	C+	66-69%
A	80-89%	C	60-65%
B+	76-79%	D	50-59%
B	70-75%	F	0 - 49%

Academic Dishonesty

Students should acquaint themselves with the University's policy on cheating and examination impersonation (see Section 3.5 of the University of Manitoba General Calendar). **Plagiarism and cheating in general, is a serious academic offence.**