THE OHIO STATE UNIVERSITY

ATMOSSC 5202
Synoptic Meteorology (21155)
Autumn 2026

Syllabus - Instructor Information

Dr. Jana Houser

Professional Qualifications
Ph.D. (2013) from the University of Oklahoma

Syllabus - Required or Recommended Readings

Textbook: Midlatitude Synoptic Meteorology by Gary Lackmann

ISBN: 978-1-878220-10-3

Please see the Course Outline provided below for a weekly breakdown of reading requirements. All reading materials are from either the textbook or from Powerpoint slides available through the Course Content on Carmen Canvas.

Syllabus - Course Schedule

Class Date	Topics	Book Material	Homework

8/26-8/30 Week 1	Introduction, Scales of motion, Units, Variables, Surface Analysis Review, Isoplething, Analyzing Fronts	Ch 1.1, 1.2, table 1.3, Ch 12, Slides	HW1 Due 8/30
8/31-9/6 Week 2	Intro to numeric weather prediction, weather models, Forecasting Techniques	Ch 10.1, 10.2, 10.3, 10.4 intro, 10.4.3, 10.4.4, 10.5 intro, 10.6 intro, 10.6.1, 10.6.3 intro, 10.7, Ch 11.2,11.3, Slides	Quiz 1 HW2 Due 9/6
9/7-9/13 Week 3	NO CLASS 9/7 – Labor Day Basic Governing Equations, Kinematics of the wind field	Ch 1.3 Ch 1.5 intro, 1.5.1, 1.5.2, Slides	Quiz 2 HW3 Due 9/13
9/14-9/20 Week 4	Advection, vorticity equation, synoptic-scale forces and force balances	Slides	Quiz 3 HW4 Due 9/20
9/21-9/27 Week 5	Jet streams, geostrophic wind, thermal wind, ageostrophic wind, Convergence, divergence and relation to surface patterns, and secondary circulations	Ch 1.4, Slides	Quiz 4 HW5 (Graded for completion) Due 9/27

9/28-10/4 Week 6	Exam 1: 9/28 - All material through Week 5 Intro to QG Dynamics	Ch. 2.1 – 2.3, Slides	NO Homework NO QUIZ
10/5-10/11 Week 7	QG Omega	2.3, Slides	Quiz 5 with Week 6 HW6 Due 10/11
10/12-10/18 Week 8	Trenberth, QG Height tendency equation and adiabatic influences	Ch. 2.4, Slides	Quiz 6 HW7 Due 10/18
10/19-10/25 Week 9	Rossby Waves	Ch 5 intro	Quiz 7 HW8 Due 10/25
10/26-11/1 Week 10	Intro to midlatitude cyclones, conveyor belt theory, Midlatitude Cyclone Weather	Ch 5 intro, 5.3. (stop before 5.3.5), Slides	Quiz 8 HW9 Due 11/1
11/2-11/8 Week 11	Behavior and evolution of midlatitude synoptic systems – QG perspective; Types of midlatitude cyclones	Ch 5.3.5, Slides	Quiz 8 (Weeks 10 & 11) HW10 (Completion only)
11/9-11/15 Week 12	Exam 2: 11/9 - All material from Week 6 through Week 12 11/11 – NO CLASS Veteran's Day		NO HW No Quiz

11/16-11/22 Week 13	Fronts, Frontogenesis, Kinematic Frontal Circulations	Slides	Quiz 9 HW 11 Due 11/22
11/23-11/29 Week 14	Dynamic frontogenesis 11/25: NO CLASS, Thanksgiving		No Quiz, this material will be on next week's
11/30-12/6 Week 15	Winter Storms	Ch 6.1 - 6.4, Slides	HW12 Due 12/6 Quiz 12 (Week 14&15)
12/7-12/13	Thermal Hs and Ls, Cold Waves	Slides	Quiz 13, No HW

Course Details - Instructor Contact Details

I am available in person during my office hours (Refer to course details document), for a few minutes after class, any time my door is open, or by appointment. Zoom meetings to discuss course content are also acceptable upon request.

For email related correspondence, I ask that you give me one full work day to respond, as I do not always have my email open and in front of me.

Course Details - Office Hours

Please refer to the Course Details Document on Carmen

Course Details - Class Meeting Details

Class Meeting Details: 12:45 PM-02:05 PM - Derby Hall 070 - MW

Course Details - Course Description

Introduction to fundamental atmospheric forces and equations and their conceptual interpretation, quasi-geostrophic theory, and application to the development, evolution, and prediction of large-scale atmospheric systems including midlatitude cyclones, frontal development and positive feedback loops with the upper atmosphere. Prereq: A grade of C- or above in 5201, Math 1151 and Physics 1250. Not open to students with credit Geog 5941.
Prerequisite(s) / Corequisites: Prereq: A grade of C- or above in 5201, Math 1151 and Physics 1250. Not open to students with credit Geog 5941.

Course Details - More About This Course

Synoptic meteorology is the study of continental-scale (i.e. synoptic) atmospheric conditions and the processes that drive changes to these conditions. Topics examined include atmospheric forces and flow balances; development and evolution of low and high pressure systems, frontal systems, jet stream and upper-air features; quasi-geostrophic theory; observational tools; operational numerical weather models; and weather forecasting techniques.

Course Details - Course Learning Outcomes

Big Picture Course Goal: Identify, explain, and forecast the behavior, evolution, and weather patterns associated with synoptic-scale weather systems using quasi-geostrophic theory to scientifically back arguments and observations.

Expected learning outcomes to assist in accomplishing the big-picture goal:

1. Interpret weather conditions from surface, upper air, radar and satellite data.
2. Identify synoptic-scale features such as surface lows, Rossby waves, jetstreaks, etc.
3. Use governing and supporting physical equations to explain atmospheric behavior.

4. Diagnose regions of synoptic-scale upward and downward vertical motions, height rises and height falls expected from quasi-geostrophic theory.
5. Predict where midlatitude cyclones will develop.
6. Forecast the evolution of Rossby waves
7. Predict surface weather associated with various configurations, stages of evolution, and storm-relative locations of synoptic-scale systems and their associated fronts.

Course Details - Course Supplies

Laptop/tablet for assignment completion

Cell phone or tablet for poll questions

Digital Pen for assignment completion

Course Details - Canvas Assignment Schedule

Date	Name	Assignment Type	Points
	End of Semester Peer Eval	Assignment	20
	Exam 1	Assignment	100
	Exam 1	Quiz	0
	Exam 2	Assignment	100
	Grp Quiz 1	Assignment	10

Date	Name	Assignment Type	Points
	Grp Quiz 10	Assignment	7
	Grp Quiz 11	Assignment	10
	Grp Quiz 12	Assignment	10
	Grp Quiz 2	Assignment	10
	Grp Quiz 3	Assignment	10
	Grp Quiz 4	Assignment	10
	Grp Quiz 5	Assignment	10
	Grp Quiz 6	Assignment	10
	Grp Quiz 7	Assignment	10
	Grp Quiz 8	Assignment	10
	Grp Quiz 9	Assignment	10
	Ind Quiz 1 8/31	Assignment	10
	Ind Quiz 10 11/17	Assignment	7
	Ind Quiz 11 12/8	Assignment	10
	Ind Quiz 12 12/8	Assignment	10

Date	Name	Assignment Type	Points
	Ind Quiz 2 9/9	Assignment	10
	Ind Quiz 3 9/14	Assignment	10
	Ind Quiz 4 9/21	Assignment	10
	Ind Quiz 5 10/5	Assignment	10
	Ind Quiz 6 10/13	Assignment	10
	Ind Quiz 7 10/20	Assignment	10
	Ind Quiz 8 11/3	Assignment	10
	Ind Quiz 9 11/17	Assignment	10
	Mid-Semester Peer Eval	Assignment	20
	Wx Challenge City 2: Glasgow	Assignment	10
	WxChallenge City 1: Savannah	Assignment	10
	WxChallenge City 3: Concord	Assignment	10
	WxChallenge City 4: Juneau	Assignment	10
	WxChallenge Reno	Assignment	10
8/30/26	Homework 1	Assignment	25

Date	Name	Assignment Type	Points
9/6/26	Homework 2	Assignment	34
9/13/26	Homework 3	Assignment	40
9/20/26	Homework 4	Assignment	40
9/27/26	Homework 5	Assignment	10
10/11/26	Homework 6	Assignment	30
10/18/26	Homework 7	Assignment	27
10/25/26	Homework 8	Assignment	25
11/1/26	Homework 9	Assignment	30
11/8/26	Homework 10	Assignment	0
11/22/26	Homework 11	Assignment	32
12/6/26	Homework 12	Assignment	30
12/11/26	Final Journal Paper	Assignment	100

Course Details - Grading Policy

Grade Scale

A	A-	B+	B	B-	C+	C	C-	D+	D	E

>92.5 %	89.5 – 92.5%	86.5 – 89.5%	82.5 – 86.5%	79.5 – 82.5%	76.5 – 79.5%	72.5 – 76.5%	69.5 – 72.5%	66.5 – 69.5%	59.5 – 66.5%	<59.5 %

Assessment:

Exams (2): (2 midterms – 15% each, total 30%)

Weekly quizzes: 20%

Weekly Homework: 20%

WxChallenge: 10%

Class participation: 10%

FINAL PROJECT: 10%

Course Details - Instructor Policies

Attendance Policy: While attendance is not formally part of your grade, I expect students to be at class EVERY LECTURE. Failure to do so will result in decreased peer evaluation grade and missed content delivery. IF YOU MISS CLASS FOR ANY REASON, Please communicate with me ASAP.

*NOTE: This course is executed following the “Team-based Learning” pedagogical method. As such, there will be distinct differences between this course and the traditional lecture-style class.

Class Time: You are expected to come prepared to class on MONDAY having already read through the week’s course materials (book, Powerpoints and/or

videos). Class material will be posted on Canvas and students may access this information at any time. In order to aid you in your preparation, I have provided you with book references matching the Powerpoint slide content. Book readings are not required, but are added to be an additional source of information. Content for assignments/exams will be based off powerpoints.

Monday's Class: We will start class time immediately with the quiz. Following the quiz, we will identify topics/questions that students want to focus on for that week, and this material will be what we talk about in class time through a series of "mini lectures". *NOTE: There will be some Powerpoint content that we do not explicitly talk about in class. But you will STILL be responsible for knowing this content. This is why it is SO IMPORTANT for you to come to class prepared. That way you know what to ask and what topics you need clarification on.

Wednesday's Class: We will finish up with any remaining mini-lecture topics that were not covered on Monday. Wednesday's class time will also consist of active learning activities including group discussion-based multiple choice questions, and application-based homework questions for the remainder of the class time. The homework questions are similar to exam questions and are therefore good study tools.

Course Details - Course Policies

Class Specific Details, Policies and Procedures: Synoptic Forecasting

1. Classes will begin AT 12:45 whether you are here or not. Please try not to be late as this disrupts the class environment. Quizzes will begin at 12:45. Tardiness may imply that you miss the quiz and receive a 0.
2. Make-up exams will only be allowed if arrangements have been made PRIOR TO the exam date or for unusual extenuating circumstances.
3. Assignments, course materials and grades will be updated and posted on

Carmen.

4. If you have special needs for any reason, please see http://www.ohio.edu/disabilities/ for information. I will only be able to grant you special permissions if you have the appropriate documentation of your disability and your needs.
5. Cell phones and other electronic devices ARE ONLY PERMITTED for use in the classroom or the lab for polling purposes, for completing assignments or if you have a specific need that requires their use. In such situations please notify me of your need and provide any university documentation that supports it.
6. For remote lectures, students are expected to have their cameras ON during the entire duration of Zoom meetings. I do not care if you just rolled out of bed, or if you are in last night's clothes, but I want to see your face, as do your classmates.
7. Computers in are ONLY to be used when working on assignments. Use of computers during lectures is not permitted.

Course Details - AI Use Policy

Using AI in this class is acceptable ONLY to help you understand content. If AI is used in ANY capacity while completing an assignment, you must acknowledge this in a written statement on the question for which you used it. PLEASE NOTE: AI answers may NOT be correct, and often will not explain course concepts the way I explain them. If you answer a question using AI and it is NOT congruent with the way I am presenting material, I reserve the right to award 0 points for the question, even if the AI generated answer is not incorrect.

Syllabus - University Policies

Office of Undergraduate Education - Standard Syllabus Statements

- Academic Misconduct
- Religious Accommodations

- Accommodations for Disability and Illness
- Intellectual Diversity
- Grievances and Solving Problems
- Creating an Environment Free from Harassment, Discrimination, and Sexual Misconduct
- Copyrights
- Content Warnings
- Mental Health Support
- Resources for Military-Connected Students
- Campus-wide Class Cancellations