Syllabus for ATMS 310 – Kinematics and Dynamics – Spring 2026

Description

A course that focuses on understanding basic 'ingredients' of the atmosphere and how, combined in the proper amounts and at the right time, can result in the development of storms bringing hazardous weather. Tools will be developed that help with both the diagnosis and prognosis of these atmospheric 'ingredients' in the mid-latitudes.

Instructor

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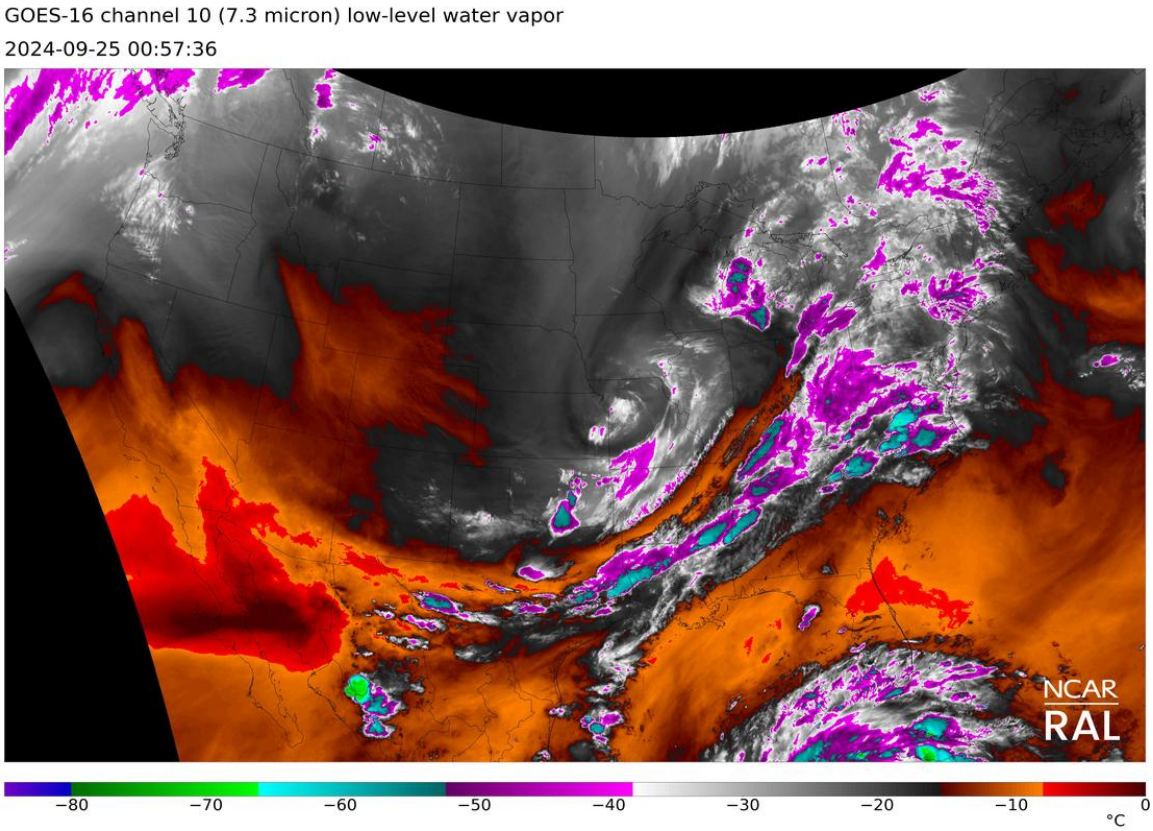
Textbook

"An Introduction to Dynamic Meteorology" (fourth edition) by J. R. Holton © 2004

Many concepts in this course are described in various COMET modules (https://www.meted.ucar.edu/index.php). It is worthwhile getting a MetEd (COMET) account, if you don't already have one.

Student Learning Outcomes

- develop the tools to begin building an accurate conceptual model of atmospheric structure and evolution valid on the synoptic-scale
- improve problem-solving skills by applying knowledge to actual weather case studies



Date	Topic	Reading/Homework*
M 12 Jan 2026	First day/Introduction	Holton (2004), Chapter 1
W 14 Jan	"	
M 19 Jan	*MLK Jr. holiday*	*no classes*
W 21 Jan	"	Project #1 due
M 26 Jan	Basic Conservation Laws	Holton (2004), Chapter 2
W 28 Jan	"	Quiz #1
M 2 Feb	"	Project #2 due
W 4 Feb	Basic Equation Applications	Holton (2004), Chapter 3
M 9 Feb	"	
W 11 Feb	"	Project #3 due, Quiz #2
M 16 Feb	Circulation and Vorticity	Holton (2004), Chapter 4
W 18 Feb	Lecture/review	
M 23 Feb	Mid-term I	12 Jan – 18 Feb material
W 25 Feb	Circulation and Vorticity	Holton (2004), Chapter 4
M 2 Mar	"	Project #4 due
W 4 Mar	Quasi-Geostrophic Analysis	Holton (2004), Chapter 6
M 16 Mar	"	
W 18 Mar	"	
M 23 Mar	"	Quiz #3
W 25 Mar	"	
M 30 Mar	"	Project #5 due
W 1 Apr	Lecture/review	
M 6 Apr	Mid-term II	25 Feb – 1 Apr material
W 8 Apr	Atmospheric Waves	Holton (2004), Chapter 7
M 13 Apr	"	
W 15 Apr	"	Project #6 due
M 20 Apr	Baroclinic Instability	Holton (2004), Chapter 8
W 22 Apr	"	Quiz #4
M 27 Apr	"	Project #7 due
W 29 Apr	*Reading Day*	
Final Exam Week	Final Exam	12 Jan – 27 Apr material

*assignment completed before class meets on this date

Outline

Introduction {Holton, Ch. 1}
Basic Conservation Laws {Holton, Ch. 2}
Basic Equation Applications {Holton, Ch. 3}
Circulation and Vorticity {Holton, Ch. 4}
Quasi-Geostrophic Analysis {Holton, Ch. 6}
Atmospheric Waves {Holton, Ch. 7}
Baroclinic Instability {Holton, Ch. 8}

Grading

Projects	15%
Quizzes	5%
Exam I	25%
Exam II	25%
Final Exam	30%
Total	**100%**

$92\% < \text{total score} \leq 100\%$	A
$90\% < \text{total score} \leq 92\%$	A-
$88\% < \text{total score} \leq 90\%$	B+
$82\% < \text{total score} \leq 88\%$	B
$80\% < \text{total score} \leq 82\%$	B-
$78\% < \text{total score} \leq 80\%$	C+
$72\% < \text{total score} \leq 78\%$	C
$70\% < \text{total score} \leq 72\%$	C-
$68\% < \text{total score} \leq 70\%$	D+
$60\% < \text{total score} \leq 68\%$	D
$\text{total score} \leq 60\%$	F

Projects

Project assignments consist of "work 'em out" (WEO!) tasks whose answers each student will hand in *individually*. On occasion, the project assignment will involve the creation of figures as part of your response, utilizing (or developing) your ability to produce graphics. You are encouraged to form study groups as a means to brainstorm the solution to projects. However, each student is responsible for understanding the concepts covered in each project as they will re-appear on quizzes, mid-terms, and the senior comprehensive exam.

Quizzes

Quizzes will be given occasionally, at the end of the class period during those weeks when we are in the midst of lecture material (non-exam weeks). Quizzes are given to help the student gauge their understanding of the weekly lecture material and the individual "work 'em out" questions on the projects. The lowest quiz score will be ***dropped*** and not count toward the final course grade.

Exams I and II

The mid-term exams (I and II) will be primarily testing new material introduced since the previous exam or since the start of the semester.

Final Exam

The final exam is a *comprehensive* exam in which all the material contained in the entire course is testable.

Assignment/Quiz/Exam Policy

Assignments are to be handed in <u>before the start of lecture</u> on the date they are due. Assignments handed in after the start of lecture are considered late until 3:00 pm on the day they are due and will have an automatic 10% deduction from their final score. Assignments handed in after 3:00 pm on the day they are due will receive no credit.

Quizzes and Exams are written tests and will be taken on the date they are scheduled, unless circumstances (e.g. medical or loss in the family) warrant. Make-up quizzes and exams for special

circumstances will consist of an individual oral graded question and answer session at a mutually agreed upon time outside of the usual class meeting time.

Extra Credit

Participate in the national weather challenge forecast competition and earn *five* points on the ATMS 310 final exam. "Win" the forecast contest for all students enrolled in Kinematics and Dynamics and earn *seven* points on the final exam. You must earn a score above climatology to receive extra credit points via the weather challenge.

Office of Accessibility & Academic Accommodations

UNC Asheville is committed to providing an inclusive experience, accessible learning environments and equal opportunity to individuals with disabilities in accordance with the Americans with Disabilities Act (ADA) and Section 504 of the Rehabilitation Act.

If you are a student experiencing barriers to access or full participation in this course on the basis of a disability, contact the Office of Accessibility to apply for reasonable accommodations and discuss available resources. You may contact the Office of Accessibility at academicaccess@unca.edu or 828-251-6292.

Students are responsible for discussing their Letter of Accommodations (LOA) with their faculty. Students and faculty are encouraged to discuss the LOA as early in the semester as possible to allow for extended access to accommodations. However, students may disclose a disability at any point in the semester. Accommodations are not retroactive and are activated when the LOA is discussed.

Sexual Harassment and Misconduct

UNC Asheville is dedicated to cultivating and maintaining a safe, respectful, and inclusive environment, free from harassment and discrimination. We strive to ensure that all have equal access to the educational and employment opportunities the University provides. If you or someone you know has been affected by sexual or gender-based harassment, including sexual assault, dating or domestic violence, or stalking, please know that help and support are available. UNC Asheville strongly encourages all members of the community to take action, seek support, and report incidents of sexual harassment to the Title IX Office. You may contact the Title IX Office or Heather Lindkvist, the Title IX Coordinator, directly at 828.232.5658 or at titleix@unca.edu or learn more by visiting titleix.unca.edu .

As a faculty member, I am a "responsible employee" and private resource. This means that if you share any information or discuss an incident with me regarding sexual or gender-based harassment, I must disclose this information to the Title IX Coordinator. Our goal is to ensure you are aware of the range of options available to you and have access to the resources you may need.

If you wish to speak with a confidential resource, contact University Health and Counseling Services at 828.251.6520. Off-campus confidential resources include Our Voice (24-Hour Hotline at 828.255.7576) and Helpmate (24-Hour Hotline at 828.254.0516).

Academic Alerts

Faculty at UNC Asheville have access to an Academic Alert system. The purpose of this system is to communicate with students about their progress in courses. Alerts can indicate concerns (e.g., academic difficulty, attendance problems) or reflect on the good work you're doing. Professors use the Alert system because they are invested in student success and want to encourage open conversations about how students can improve their performance. When a faculty member submits

an alert that expresses a concern, the student receives an email from Academic Advising notifying them of the alert. If a student receives three or more alerts, they will need to meet with a Student Success Specialist in the Academic Success Center. The instructor may also request to meet with the student to discuss the alert. It is in the student's best interest to address the alert quickly, as students who do so are more likely to earn credit for the course. Questions about the Academic Alert system can be directed to Anne Marie Roberts (amrober1@unca.edu) in the Academic Success Center.

University Writing Center

The University Writing Center (UWC) supports writers in one-on-one sessions lasting 10 to 45 minutes. Consultants can help writers organize ideas, document sources, and revise prose. If you visit the UWC, bring a copy of your assignment, any writing or notes you may have, and the sources you are working with. Make an appointment by visiting writingcenter.unca.edu and clicking on "Schedule an Appointment," or drop in during open hours Monday-Friday.

Academic Honesty

The university's policy on academic honesty states that "As a community of scholars dedicated to learning and the pursuit of knowledge UNC Asheville relies on the honesty and academic integrity of all the members of its community. Any act of plagiarism or cheating is academic dishonesty. A person who knowingly assists another in cheating is likewise guilty of cheating. According to the instructor's view of the gravity of the offense, a student may be punished by a failing grade or a grade of zero for the assignment or test, or a failing grade in the course. If it seems warranted, the instructor may also recommend to the Provost dismissal or other serious university sanction." I expect that you will exercise integrity in all quizzes, exams, and written assignments. Please email me or pop in during student hours if you have additional questions or need clarification on any point.