

### Syllabus for ATMS 373 – Mountain Meteorology – Spring 2021

Date	Topic	Reading/Homework*
W 20 Jan 2021	Introduction/ Overview	Chapters 3-6, 9
M 25 Jan	Background	Lecture notes
W 27 Jan	Mountain Climates	Chapters 1, 2
M 1 Feb	“	
W 3 Feb	“	Quiz#1, TH#1 due
M 8 Feb	Clouds and Fogs	Chapter 7
W 10 Feb	“	TH#2 due
M 15 Feb	“	Quiz#2
W 17 Feb	Precipitation	Chapter 8 (8.1-8.6)
M 22 Feb	“	
W 24 Feb	“	TH#3 due
M 1 Mar	“	
W 3 Mar	“	Quiz#3
M 8 Mar	Reports, Round#1	Presentation#1 due
W 10 Mar	break	no classes
M 15 Mar	Lecture/Review	
W 17 Mar	Exam I	20 Jan – 15 Mar material
M 22 Mar	Terrain-Forced Flows	Chapter 10
W 24 Mar	“	
M 29 Mar	“	
W 31 Mar	“	TH#4 due
M 5 Apr	“	
W 7 Apr	“	TH#5 due
M 12 Apr	“	Quiz#4
W 14 Apr	Diurnal Mountain Winds	Section 8.7, Chapter 11
M 19 Apr	“	TH#6 due
W 21 Apr	“	Quiz#5
M 26 Apr	Reports, Round#2, Lecture/Review	Presentation#2 due
Final Exam Period	Exam II	22 Mar – 26 Apr material

\*assignment completed before class meets on this date

#### Description

“I think there is a lesson for not only Asheville but other surrounding towns to learn from Boone as well. True, they get more snow than just about anyone in WNC...”

A quote from the AC-T web site commenting on a recent snow storm impacting western North Carolina. It reflects the often-localized nature of weather for those living in the vicinity of mountains, making precise forecasts a difficult proposition. This course is intended to give the student an appreciation of how mountain ranges can modulate the large-scale weather and we'll examine several cool and warm season scenarios in which this modulation occurs. An outcome of this course is for the student to (**Student Learning Outcomes**)

- understand how adjustments to a local weather forecast might need to be made when meso- and synoptic-scale atmospheric disturbances interact with mountains
- inspire a curiosity about the natural world that motivates the student to continue their learning about mountain meteorology beyond this course
- develop an ability to make a significant contribution to a team-based research effort

## Outline

- Introduction (Chapters 3-6, 9)
  - Overview of course
  - Background information
    - A branch of mesoscale meteorology
- Mountain climates (Chapters 1, 2)
  - Lee cyclogenesis (Article 1)
- Clouds and fogs (Chapter 7)
- Precipitation (Chapter 8, Sections 8.1-8.6)
  - Cool season orographic storms (MetEd Link 1)
  - Impact on fronts (Article 2)
  - NW flow snow (Article 3)
- Terrain forced flows (Chapter 10, MetEd Link 2)
  - Mountain waves (MetEd Link 3)
  - Windstorms (MetEd Link 3)
  - Gap flows (MetEd Link 4)
  - Barrier jet (MetEd Link 5)
  - Cold air damming (MetEd Link 6)
  - Coastal jet (MetEd Link 7)
  - Coastally-trapped wind reversals (MetEd Link 8)
- Diurnal mountain winds (Chapter 8; Section 8.7, Chapter 11)
  - Impact on convection (Article 4)
  - Impact on tornadoes (Article 5)

## Grading

Treasure Hunts	10%
Quizzes	10%
MountainWx [2]	10%
Exam I	20%
Exam II	20%
Reports [2]	30%
<b>Total</b>	<b>100%</b>

92% < total score ≤ 100%	A
90% < total score ≤ 92%	A-
88% < total score ≤ 90%	B+
82% < total score ≤ 88%	B
80% < total score ≤ 82%	B-
78% < total score ≤ 80%	C+
72% < total score ≤ 78%	C
70% < total score ≤ 72%	C-
68% < total score ≤ 70%	D+
60% < total score ≤ 68%	D
total score ≤ 60%	F

## **Treasure Hunts**

Occasional assignments to make certain that you have been discovering the “golden nuggets” from your reading and MetEd web assignments. The Treasure Hunts will prepare you for quizzes and mid-terms by highlighting key points of the various mountain meteorology topics.

## **Quizzes**

Quizzes will be given at the conclusion of each unit, for a total of five. Quizzes are given to help the student gauge their understanding of the material from the assigned reading and MetEd (COMET) modules. The lowest quiz score will be *dropped* and not count toward the final course grade.

## **MountainWx**

Each student will have two opportunities during the semester to find a significant mountain-influenced weather event over the past week and present the case study to the class. The presentation should be no longer than **FIVE** minutes and should consist of a synoptic discussion (SLP, 850, 700, 500, and 300 hPa maps), show image loops (radar and/or satellite), and discuss how mountain effects might have played a role in the weather event. The MountainWx presentations will take place regularly at the beginning of each non-exam class period.

## **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. Exam II will be taken during Final Exams week and will test the material given during the second half of the semester.

## **Reports**

Each student will have two opportunities to be part of a research team responsible for reporting on an extreme weather event related to mountain meteorology that had a significant societal impact (e.g. lives and property threatened). There are two options for these projects [a] a presentation that reports the findings contained in a published AMS journal article describing the extreme mountain meteorology event, or [b] a presentation that reports on your own personal research related to an extreme mountain meteorology event. The “deliverables” for either type of report are a 20 minute oral presentation in the classroom and a one-page study guide that describes the **MOST IMPORTANT** results of the research project. Information from the study guide will be testable material on the mid-term exams and will be shared with all students in the class.

Report option [b] will have the additional required deliverable of a type-written double-spaced paper *at least* seven pages long in which at least three primary references have been utilized in gathering the report information. Wikipedia does not count as a reference.

### **Assignment/Quiz/Exam Policy**

Assignments are to be handed in before the start of lecture on the date they are due. Assignments handed in after the start of lecture are considered late until 4:00 pm on the date they are due and will have an automatic 10% deduction from their final score. Assignments handed in after 4:00 pm on the date 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 unexcused absences will consist of an individual oral graded question and answer session at a mutually agreed upon time outside of the usual class meeting time.

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### **Instructor**

Doug Miller  
232-5158

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dmiller@unca.edu](http://www.atms.unca.edu/dmiller/dmiller@unca.edu)

### **Textbook**

“Mountain Meteorology, Fundamentals and Applications” by C. David Whiteman

COMET (MetEd) modules related to Mountain Meteorology (see lecture packets for web site locations)

Five articles on Moodle at “Atmospheric Sciences 373.001: Mountain Meteorology” ( <http://learnonline.unca.edu/> )

### **Reference**

“Atmospheric Processes over Complex Terrain” Edited by William Blumen

**(continued)**

### **Office of Academic Accessibility**

UNC-Asheville values the diversity of our student body as a strength and a critical component of our dynamic community. Students with disabilities or temporary injuries/conditions may require accommodations due to barriers in the structure of facilities, course design, technology used for curricular purposes, or other campus resources.

Students who experience a barrier to full access to this class should let the professor know, and/or make an appointment to meet with the Office of Academic Accessibility as soon as possible. To make an appointment, call 828.232.5050; email [academicaccess@unca.edu](mailto:academicaccess@unca.edu); use this link <https://uncaoaaintake.youcanbook.me/>; or drop by the Academic Accessibility Office, room 005 in the One Stop suite (lower level of Ramsey Library). Learn more about the process of registering, and the services available through the Office of Academic Accessibility here: <https://oaa.unca.edu/>

While students may disclose disability at any point in the semester, students who receive Letters of Accommodation are strongly encouraged to request, obtain and present these to their professors as early in the semester as possible so that accommodations can be made in a timely manner. It is the student's responsibility to follow this process each semester.

### **Sexual Harassment and Misconduct**

All members of the University community are expected to engage in conduct that contributes to the culture of integrity and honor upon which the University of North Carolina at Asheville is grounded. Acts of sexual misconduct, sexual harassment, dating violence, domestic violence and stalking jeopardize the health and welfare of our campus community and the larger community as a whole and will not be tolerated. The University has established procedures for preventing and investigating allegations of sexual misconduct, sexual harassment, dating violence, domestic violence and stalking that are compliant with Title IX federal regulations. To learn more about these procedures or to report an incident of sexual misconduct, go to [titleix.unca.edu](http://titleix.unca.edu). Students may also report incidents to an instructor, faculty or staff member, who are required by law to notify the Title IX Office.

### **Academic Alerts**

Faculty at UNCA are encouraged to use the university's Academic Alert system to communicate with students about their progress in courses. Academic Alerts can reflect that a student's performance is satisfactory at the time the alert is submitted, or they can indicate concerns (e.g., academic difficulty, attendance problems, or other concerns). Professors use the alert system because they are invested in student success and want to encourage open conversations about how students can improve their learning, and students who respond to alerts quickly are consistently more likely to earn credit for the course. Please note, professors of 100-level courses are required to submit at least one alert about each student on or before the seventh week of classes.

When a faculty member submits an alert that expresses a concern, the student receives an email from Academic Advising notifying them of the alert and subsequent registration hold on their account. To clear the hold, the student must complete a short Google Response Form included in the alert e-mail; the results will be shared with their instructor and advising staff. Instructors may also request to meet with the student to discuss the alert.

Questions about the Academic Alert system can be directed to Anne Marie Roberts ([amrober1@unca.edu](mailto:amrober1@unca.edu)) in OneStop Advising and Learning Support.

### **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](http://writingcenter.unca.edu) and clicking on "Schedule an Appointment," or drop in during open hours Monday-Friday.

### **Academic Integrity**

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, cheating, or use of unauthorized materials or assistance is academic dishonesty. A person who knowingly assists another in academic dishonesty is likewise guilty of dishonesty. A student committing a first offense of dishonesty will receive a failing grade or a grade of zero for the assignment or test. A student committing a second offense of dishonesty will receive a failing grade in the course and be reported to the Senior Director of Student Success.

In all situations where a student has been disciplined for academic dishonesty, the instructor must submit a brief statement of the case to the Senior Director of Student Success with a copy to the student. The Senior Director maintains records of academic dishonesty incidents and notifies the instructor when a student is found to have multiple offenses. Depending upon the severity and/or repetition of the offense, the Senior Director and/or instructor may recommend that the Provost impose an additional penalty, such as cancellation of graduation with honors, cancellation of scholarships, or dismissal from the university. If the Provost decides that additional penalties are warranted, the student will be notified in writing.

If a student feels that he or she has been unjustly accused of academic dishonesty, the student has ten (10) class days from the date of the instructor's written notification to the student to respond in writing. This response is to be sent to both the instructor and the Senior Director of Student Success. The instructor should then meet with the student to discuss the charges within five (5) class days. If needed, the student may then contact the Senior Director for assistance in identifying options for possible resolution. If needed, the Faculty Conciliator will be contacted to mediate and/or convene the Academic Appeals Board.