

### Syllabus for ATMS 373 – Mountain Meteorology – Spring 2014

Date	Topic	Reading/Homework*
M 13 Jan 2014	Introduction/ Overview	Chapters 3-6, 9
W 15 Jan	Background	Lecture notes
W 22 Jan	Mountain Climates	Chapters 1, 2
M 27 Jan	“	
W 29 Jan	Snow day	Classes cancelled
M 3 Feb	Mountain Climates	Quiz#1, TH#1 due
W 5 Feb	Clouds and Fogs	Chapter 7
M 10 Feb	Precipitation	TH#2 due, Chapter 8 (8.1-8.6)
W 12 Feb	Snow day	Classes cancelled
M 17 Feb	Precipitation	Quiz#2
W 19 Feb	“	
M 24 Feb	“	TH#3 due
W 26 Feb	“	Quiz#3
M 3 Mar	Field trip	Haywood County, NC
W 5 Mar	Reports, Round#1	Presentation#1 due
M 17 Mar	Lecture/Review	
W 19 Mar	Exam I	13 Jan – 17 Mar material
M 24 Mar	Terrain-Forced Flows	Chapter 10
W 26 Mar	“	
M 31 Mar	“	
W 2 Apr	“	TH#4 due
M 7 Apr	“	
W 9 Apr	“	TH#5 due
M 14 Apr	“	Quiz#4
W 16 Apr	Diurnal Mountain Winds	Section 8.7, Chapter 11
M 21 Apr	“	Quiz#5, TH#6 due
W 23 Apr	Research Symposium	<i>no day classes</i>
M 28 Apr	Reports, Round#2	Presentation#2 due
Final Exam Period	Exam II	24 Mar – 28 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* ten 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 4:30 pm on the date they are due and will have an automatic 10% deduction from their final score. Assignments handed in after 4:30 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

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### **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

### **Disabilities**

Contact Prof. Miller early in the course if you have a disability that requires special accommodation.

### **Academic Integrity**

Cheating or plagiarism results in a failed assignment, quiz, or exam on the first infraction. A second infraction results in course failure and a report to the UNCA administration. See <http://www.unca.edu/catalog/academicregs.html> under “Student Responsibilities” for a refresher on the UNCA policy.