

ATMS 205 Weather Analysis

Fall 2019

What is all about this course?

Students will learn map analysis skills and fundamental concepts of meteorology by studying surface and upper air maps, vertical atmospheric profiles, and METAR/TAF/MOS decoding.

Who is the instructor?

Dr. Huo-Jin (Alex) Huang, RRO 236B, 232-5157
Dept. of Atmospheric Sciences, UNCA
e-mail: ahuang@unca.edu
<http://www.atms.unca.edu/ahuang>

What is the structure of the course?

- PowerPoint Lectures
- 13 Lab assignments
- One open-book final exam

Office Hours:

Monday, Tuesday, Thursday, 2:00—3:00 pm;
(or by appointment, but walk-in is always welcome)

When and Where do we meet?

3:30—6:00 pm, Monday, RRO 238

Textbooks:

- Weather Analysis Handout_(2015) compiled by Alex Huang.
- Weather Analysis & Forecasting Handbook (2011) by Tim Vasquez.

How will you be graded?

- Lab Assignments: 65%;
- Final Exam: 30%;
- Classroom participation: 5%;



Final Open-book In-class Exam:

3:00—5:30 pm, Friday, 12/6/2019

References:

- COMET Learning Module: Introduction to Meteorological Charting (2015).
- Aviation Weather Services Handbook AC 00-45G (2010) by FAA and NWS.

Grade Scale (100%)

A \geq 93: A-: 92.5-90;
B+: 89.5-87; B: 86.5-83; B-: 82.5-80;
C+: 79.5-77; C: 76.5-73; C-: 72.5-70;
D+: 69.5-67; D: 66.5-60; F: \leq 59.5.



How can you succeed in this course?

- Come to Classes
- Do your homework
- Read materials
- Talk to Instructor
- Ask questions
- Form a study group
- Think, review, connect
- Choose right friends
- Be healthy



How can I contact the instructor? By e-mail to ahuang@unca.edu



ATMS 205 LAB OUTLINE

Week	Dates	Subject	EX
1	8/19	Geography, Isoplething, Isothermal Analysis	1
2	8/26	METAR, Surface Station Model, Isobaric Analysis	2
3	9/2	Labor Day, No Classes	
4	9/9	Isothermal/Isobaric/Frontal Analysis	3
5	9/16	MOS/TAF Decoding	4
6	9/23	Winds and Thermal Advection	5
7	9/30	RAOB, Upper Air Station Model, Contouring	6
8	10/7	Upper air (850, 700, 500, 300 hPa) Maps	7
9	10/14 - 15	Fall Break	
10	10/21	Upper air (850, 700, 500, 300 hPa) Maps	7
11	10/28	1000-500 hPa Thickness and 500 hPa Vorticity Maps	8
12	11/4	Current Weather Case Study	9
13	11/11	Thermodynamics Diagram and Stability Indices	10
14	11/18	Severe Weather Case Study	11
15	11/25	Winter Weather Case Study	12
15	11/26	UNCA Fall UGR Symposium, NO CLASSES	
15	11/27 - 29	Thanksgiving Holidays	
16	12/2	Streamline Analysis and Hodograph	13
16	12/4	Reading Day, No classes	
17	12/6	In-Class Open-book FINAL EXAM, 3:00 – 5:30 pm.	

Student Learning Outcomes: The students in ATMS 205 Weather Analysis are expected to achieve the following goals successfully upon the completion of the course, so they are able:

- To understand definitions and applications of atmospheric variables;
- To comprehend relationships among weather variables;
- To learn basics of meteorology, in-situ observations, and remote sensing technology;
- To practice surface/upper air map plotting and analysis techniques;
- To understand the representations of weather maps and diagrams, and meteorological codes;
- To identify and interpret weather processes from analyzed weather maps;
- To develop analytical skills and scientific common sense;
- To enhance the ability for verbal and written communications; and
- To learn to work with classmates in and out of the classroom.



Special Remarks: **Class attendance is strongly recommended.** You are solely responsible for the consequences due to your absence. No make-up quizzes/tests will be given. An exception may be granted for uncontrollable circumstances and medical reasons. You have to consult with the instructor at your earliest convenience for exceptions. A **significant** reduction of your score on your late assignments and make-up quizzes/tests may be applied. **You will receive an F for the semester if you miss more than 5 class periods without any justifiable and excusable reasons. No operational electronic devices are allowed during the class period unless you are permitted to use them.**



Academic Integrity: Individual honesty and responsibility are expected, and academic integrity is enforced. 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. Please review the procedures outlined in Section 8.3 of the UNCA Faculty Handbook (<http://www3.unca.edu/aa/handbook/8.htm>) that relate to academic dishonesty.



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; use this link <https://uncaoaa intake.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. 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. Students may also report incidents to an instructor, faculty or staff member, who are required by law to notify the Title IX Office.



Understanding Academic Alerts

Faculty at UNC Asheville are encouraged to use the university's Academic Alert (AA) system. The purpose of this system is 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 AA 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 and subsequent registration hold on their account. To clear the hold, the student must complete an online Response Form included in the alert e-mail. The student's responses will be shared with the instructor and advising staff. If a student receives three or more alerts, they will need to meet with an advisor by scheduling an appointment using the online appointment service at advising.unca.edu and select 'Academic Alert Appointment' as the type of appointment. The professor may also request to meet with the student to discuss the alert. It is in the student's best interest to complete the alert process quickly, as students who do so are more likely to earn credit for the course. Failure to complete the alert process means the student won't be able to register for the next semester's classes until they have submitted the required form and completed any requested meeting requirements. Questions about the alert system can be directed to *Anne Marie Roberts* (amrober1@unca.edu) in the [Academic Success Center](#).



Writing Center

The University Writing Center (UWC) supports writers in one-on-one sessions with student writing consultants. Consultants can help writers decipher a prompt, organize ideas, document sources, and revise prose. When you visit the UWC, bring a copy of your assignment, any writing or notes you may have, and the sources you are working with. To make an appointment, visit writingcenter.unca.edu and click on "Schedule an Appointment."

Disclaimer: This syllabus is the contract between the instructor and students. Most information will not be changed. However, the schedule may be altered due to unforeseeable circumstances upon the agreement between the instructor and students.

Useful COMET MetED MODULES on Observations, Charting, and Analysis

NOTE: You are required to register for MetED online (<https://www.meted.ucar.edu/>) so you can access the modules, the registration is FREE. You are asked to study these modules during the semester and to report what you have learned from these modules.



Weather Observing Fundamentals

Languages: [English](#)

Publish Date: 2014-03-11

Skill Level: **1**

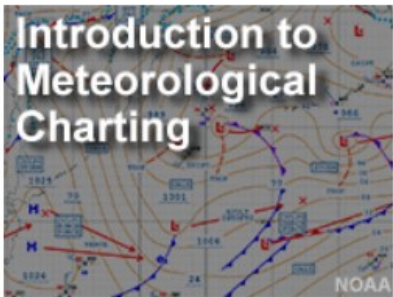
Completion Time: 2.00 - 3.00 h

Topics:

[Oceanography/Marine Meteorology](#), [Other](#)

★★★★★ (4 reviews)

"Weather Observing Fundamentals" provides guidance for U.S. Navy Aerographer's Mates, Quartermasters, and civilian observers tasked with taking and reporting routine, special, and synoptic observations. Although the focus of this lesson is on shipboard observations, much of ... [Read more »](#)



Introduction to Meteorological Charting

Languages: [English](#)

Publish Date: 2015-07-23

Skill Level: **0**

Completion Time: .50 - .75 h

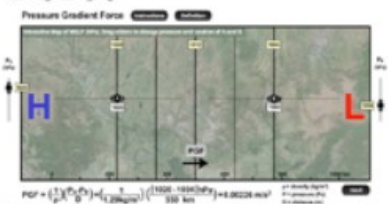
Topics:

[Other](#)

★★★★★ (3 reviews)

This lesson provides a brief overview of surface and upper-air data and how these data are plotted on meteorological charts. The content introduces various charting and reporting techniques, including station models, contour analyses, streamlines, and upper air maps. ... [Read more »](#)

Pressure Gradient Force



Topics in Dynamic Meteorology: Pressure Gradient Force

Languages: [English](#), [Spanish](#)

Publish Date: 2013-03-12

Skill Level: **1**

Completion Time: 0 - .25 h

Topics:

[Other](#)

★★★★★ (1 review)

This module is a learning object on a foundational aspect of dynamic meteorology, the pressure gradient force. As a learning object, it is meant to supplement other teaching material in a course by elucidating a specific concept. The horizontal pressure gradient force is ... [Read more »](#)



Skew-T Mastery

Languages: [English](#), [Spanish](#)

Publish Date: 2006-10-04

Last Updated On: 2014-04-11

Skill Level: **2**

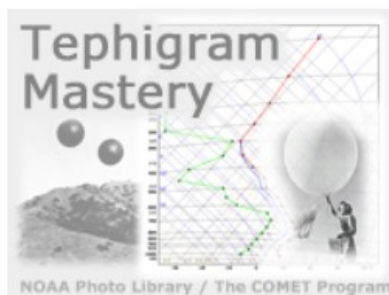
Completion Time: 7.00 - 8.00 h

Topics:

[Convective Weather](#), [Mesoscale Meteorology](#), [Other](#)

★★★★★ (2 reviews)

Meteorologists typically examine atmospheric soundings in the course of preparing a weather forecast. The skew-T / log-P diagram provides the preferred method for analyzing these soundings. This module comprehensively examines the use of the skew-T diagram. It explores ... [Read more »](#)



Tephigram Mastery

Languages: English, French, Spanish

Publish Date: 2013-04-24

Skill Level: 2

Completion Time: 7.00 - 8.00 h

Topics:

Convective Weather, Mesoscale Meteorology, Other

★★★★★ (6 reviews)

Since the advent of rawinsonde observations, thermodynamic diagrams have been used by meteorologists to analyze sounding data in the course of preparing their weather forecasts. This module comprehensively examines the use of the tephigram, widely used for over 60 years by ... [Read more »](#)



Skywarn Spotter Convective Basics

Languages: English

Publish Date: 2011-04-22

Skill Level: 0

Completion Time: 1.00 - 1.25 h

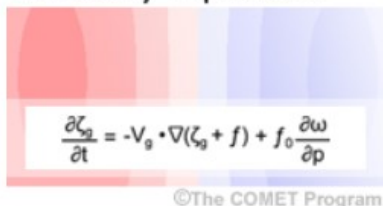
Topics:

Convective Weather, Other

★★★★★ (58 reviews)

The "SKYWARN® Spotter Convective Basics" module will guide users to a basic understanding of convective storms. Through three different scenarios, you will cover reporting and proper communication of local storm reports to the National Weather Service (NWS), personal ... [Read more »](#)

Quasi-geostrophic Vorticity Equation



Quasi Geostrophic Vorticity Equation

Languages: English, Spanish

Publish Date: 2014-09-30

Last Updated On: 2014-09-03

Skill Level: 3

Completion Time: 0 - .25 h

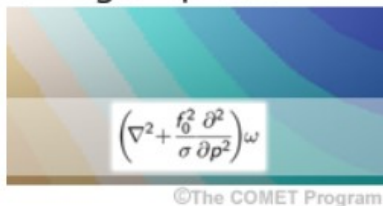
Topics:

Other

★★★★★ (1 review)

This learning object/widget is designed for upper-level undergraduates or forecaster interns who want to apply their knowledge of the Quasi-geostrophic Vorticity Equation to forecast situations. The interactivity helps users see how each variable interacts within the ... [Read more »](#)

Quasi-geostrophic Omega Equation



Quasi Geostrophic Omega Equation

Languages: English, Spanish

Publish Date: 2014-06-30

Last Updated On: 2014-06-29

Skill Level: 3

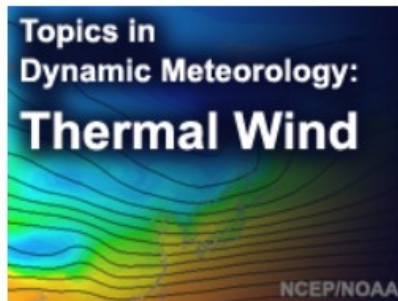
Completion Time: 0 - .25 h

Topics:

Other

★★★★★ (1 review)

This learning object/widget is designed for upper-level undergraduates or forecaster interns who want to apply their knowledge of the Quasi-geostrophic Omega Equation to forecast situations. The interactivity helps users see how each variable interacts within the equation ... [Read more »](#)



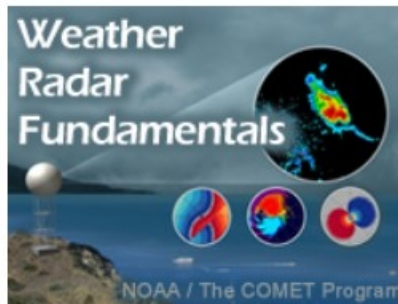
Topics in Dynamic Meteorology: Thermal Wind

Languages: English, Spanish
Publish Date: 2012-03-20
Last Updated On: 2014-07-02
Skill Level: 1
Completion Time: 1.25 - 1.50 h
Topics:

Other

★★★★★ (2 reviews)

This module explores the dynamic links between temperature, pressure, and wind in the atmosphere. The qualitative description of the relationships is augmented with "Math Sidebars" that provide a quantitative treatment. Numerous applications to climatology and forecasting ... [Read more »](#)



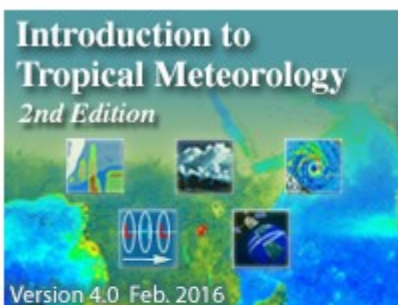
Weather Radar Fundamentals

Languages: English, Spanish, French
Publish Date: 2012-03-21
Skill Level: 1
Completion Time: 2.00 - 3.00 h
Topics:

Radar Meteorology

★★★★★ (14 reviews)

This 2-hour module presents the fundamental principles of Doppler weather radar operation and how to interpret common weather phenomena using radar imagery. This is accomplished via conceptual animations and many interactive radar examples in which the user can practice ... [Read more »](#)



Introduction to Tropical Meteorology, 2nd Edition, Chapter 2: Tropical Remote Sensing Applications

Languages: English, Spanish
Publish Date: 2010-12-22
Last Updated On: 2016-03-04

Skill Level: 1
Completion Time: 1.00 - 1.25 h
Topics:

Radar Meteorology, Satellite Meteorology, Tropical/Hurricanes

★★★★★ (157 ratings)

This chapter covers remote sensing, the primary method of observing weather and climate across the global tropics. Learners will become familiar with the scientific basis and applications of radar and satellite remote sensing from examples in which clouds and precipitation ... [Read more »](#)



GOES-R ABI: Next Generation Satellite Imaging

Languages: English, Spanish
Publish Date: 2013-02-19
Skill Level: 1
Completion Time: 1.00 - 1.25 h
Topics:

Satellite Meteorology

★★★★★ (1 review)

This extension of the COMET module "GOES-R: Benefits of Next Generation Environmental Monitoring" focuses on the ABI instrument, the satellite's 16-channel imager. With increased spectral coverage, greater spatial resolution, more frequent imaging, and improved image ... [Read more »](#)