

ATMS 251 Mathematics in Meteorology Lab

$$\frac{\partial u}{\partial t} + u \frac{\partial u}{\partial x} + v \frac{\partial u}{\partial y} + \omega \frac{\partial u}{\partial p} - fv = -\frac{\partial \Phi}{\partial x}$$

What is all about this course?

A lab to study the basics of mathematics, equations and theories used in meteorology. It is to help students to learn mathematical representations of fundamental meteorological equations and how those equations can be applied to the interpretations of the weather systems and processes. This 1-credit lab course fulfills part of course requirements for meteorology majors. Prerequisites: ATMS 103 or 113; MATH 191.

Who is the instructor?

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



What is the structure of the course?

- Lab lectures
- 14 Lab assignments
- Course materials on Moodle



Office Hours:

Monday 1:30—2:00 pm;
Tuesday, Thursday 2:30 – 3:00 pm;
Wednesday 1:45 – 2:15 pm.
(or by appointment, but walk-in is always welcome)

Textbook: Mathematics in Meteorology Lab Handout (2017) by Alex Huang.

How can you succeed in this course?

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



When and Where do we meet?

2:00 – 4:30 pm, Monday
RRO 238

How will you be graded?

- 14 Lab Assignments: 65%;
- Classroom participation: 5%;
- Comprehensive in-class Open-book Final Exam: 30%.



Grade Scale (100%)

A ≥ 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: ≤ 59.5.



Exam Date:

Final Exam: 11:30 am – 2:00 pm,
Wednesday, 5/10/2017.

The best way to contact the instructor anytime?

By e-mail to ahuang@unca.edu



Student Learning Outcomes: Upon completing this course successfully, you should be able to:

- Identify and understand weather variables;
- Apply mathematics to explain meanings of meteorological equations;
- Understand the mathematical representation of weather processes; and
- Connect the meteorological equations to the daily weather.



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 **3** class periods without any justifiable and excusable reasons. **No operational electronic devices are allowed during the class period.**



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.



Accommodations for Students with Disabilities: The University of North Carolina at Asheville is committed to making courses, programs, and activities accessible to persons with documented disabilities. Students requesting accommodations and/or academic adjustments must do so through the Office of Academic Accessibility and may be required to provide supporting documentation. All information provided will remain confidential. For more information, please contact the Office of Academic Accessibility at [\(828\)232-5050](tel:8282325050) or academicaccess@unca.edu, visit them in the OneStop Student Services Center or at their website <https://oaa.unca.edu/>.



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.

ATMS 251 COURSE OUTLINE

Week	Dates	Subject	EX
1	1/16	No class	
2	1/23	Equation of State (Ideal Gas Law)	1
3	1/30	Decomposition of Wind	2
4	2/6	Temperature Tendency and Gradient	3
5	2/13	Pressure Tendency and Gradient	4
6	2/20	Continuity Equation (Conservation of Mass)	5
7	2/27	First Law of Thermodynamics (Conservation of Energy)	6
8	3/6	Moisture Variables and Clausius-Clapeyron Equation	7
9	3/13-3/19	Spring Break	
10	3/20	Moisture Equation (Conservation of Moisture)	8
11	3/27	Lapse Rates and Potential Temperature	9
12	4/3	Equations of Motion (Conservation of Momentum)	10
13	4/10	Balanced Winds	11
14	4/17	Hydrostatic Balance and Hypsometric Equation	12
15	4/24	Thermal Wind and Thermal Advection	13
16	5/1	Vorticity, Divergence, and Vorticity Advection	14
17	5/10	In-Class Open-book FINAL EXAM, 11:30 am – 2:00 pm, Wednesday.	

Title IX and Sexual Misconduct

Title IX of the Education Amendments of 1972 prohibits sex discrimination against any participant in an educational program or activity that receives federal funds. The act is intended to eliminate sex discrimination in education. Title IX covers discrimination in programs, admissions, activities, and student-to-student sexual harassment, sexual exploitation, interpersonal violence, non-consensual touching, and sexual assault.

UNC-Asheville's policy against sexual misconduct extends not only to employees of the university but to students as well. If you encounter unlawful sexual misconduct behavior or gender based discrimination, please talk to any University Responsible Employee. All University employees (except Health and Counseling center employees and employed Campus Ministers are considered Responsible Employees and are mandated to report incidents to the Title IX Office. The Title IX office consists of Dr. Jill Moffitt, UNC-Asheville's Title IX Administrator, who can be reached at [\(828\)232-5658](tel:8282325658); and Keishea Boyd, Assistant Title IX Coordinator, who can be reached at [\(828\) 258-7872](tel:8282587872). Individuals may also report anonymously at <https://police.unca.edu/anonymous-report>. For more information regarding Title IX and resources concerning sexual misconduct and its prevention please visit:

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AGE **SEXUAL**
SEXUAL ORIENTATION
STALKING **ASSAULT**
ETHNICITY
RELIGION **BATTERY**
HARASSMENT
DATING VIOLENCE **RACE**
POLITICAL AFFILIATION
MISCONDUCT

Early Alerts (EA)

Faculty at UNCA are encouraged to use the university's Early Alert system to communicate with students about their progress in courses.

Early Alerts can reflect excellent performance or satisfactory progress, or they can indicate concerns (e.g., attendance problems, missing assignments, academic difficulty, etc.).

When a faculty member submits an early alert that expresses a concern, the student receives an email from OneStop and meets with the professor to discuss the alert, completing a form as part of the process.

Professors use the EA system because they are invested in student success and want to open conversations about how students can improve their performance. Generally, early alert meetings involve the professor making sure the student understands the expectations of the course and the likely implications of the behavior(s) that led to the alert. The professor and student then set a plan for progress or discuss the student's options if it is no longer possible to pass the class.

It is in the student's best interest to complete the EA process quickly, as students who do so are more likely to earn credit for the course. Failure to complete the EA process (including meeting with the professor and submitting the required form to OneStop) will result in a registration hold; the student won't be able to register for the next semester's classes until they have met with the faculty member and turned in the required form.

Questions about the EA system can be directed to Anne Marie Roberts (amrober1@unca.edu) in OneStop.

Early Alert 