

INTRODUCTION TO METEOROLOGY (WEATHER & CLIMATE)
ATMO 101- FALL 2017
University of Hawaii at Manoa, Department of Atmospheric Sciences

Instructor: Christina Karamperidou, Ph.D.
Tel: (808) 956-2565
Email: ckaramp@hawaii.edu.
Office hours MW after class or by appointment (@ HIG 335).

Class Meetings: MWF 11:30 AM-12:20 PM
Room: MSB 100

Teaching Assistants:

David DeCou, email: ddecou@hawaii.edu, office hours: TBA
Tyler Jewel, email: tjewel@hawaii.edu, office hours: TBA

Required Materials:

- 1) *Essentials of Meteorology: An Invitation to the Atmosphere*, 8th edition, by Ahrens, C. Donald & Robert Henson. Available at the bookstore; **older or newer editions will work too.**
- 2) *iClickers*. Available at the bookstore.
- 3) lecture notes distributed on laulima.

ATTENTION: LAST DAY TO REGISTER iCLICKERS ON LAULIMA: Monday Aug 28th

Laulima website: <https://laulima.hawaii.edu/portal>

Course Description

This course provides an introduction to weather and climate phenomena. It is designed to provide comprehensive knowledge of the earth's atmosphere and its changing behavior as it relates to human activities and as it influences our daily lives. The course takes a first look at various aspects of atmospheric science including solar radiation, global circulation, environmental issues, winds, cloud formation, stability, precipitation processes, weather systems, and severe weather. The course will also cover large-scale climate processes such as El Niño, Earth's past climates and mechanisms of future climate change. It emphasizes basic physical principles and processes that are important for a better understanding of the physical world, and is designed for students of all majors interested in weather and global environmental change and other environmental disciplines.

Lab Class (ATMO 101L): This course is taught by ATMO 101 teaching assistants. It covers topics from the AAMO 101 lectures in a "hands-on" way. Most students find the lab to be helpful but *the lab is not required*.

Grades:

25%: In-class quizzes on assigned readings, participation & attendance, in-class exercises, polls etc.

25%: Midterm I

25%: Midterm II

25%: Final (covers material after Midterm II, and some general concepts of the class)

Note: There are no make ups for any exams (midterms or final) for unexcused absences.

Grading will not necessarily be on a curve. Everyone has the chance to get an A if they work for it and deserve it!

Classroom Conduct:

- Show up on time!
- Bring your iClicker!
- Do not take someone else's iClicker and click for them. *This is a violation of academic integrity for both of you, and all individuals involved will be held accountable.*
- All electronic devices (except for your iClicker) should remain off while in class.
- Cheating will result in a failing class grade.

Attendance policy:

Attendance is mandatory and is taken in each class via the iClicker. If you need to leave prior to the end of class, notify the instructor before class begins.

Except for medical emergencies or circumstances beyond your control, excuses must be submitted for consideration and be approved BEFORE the day of the exam. To take into account other circumstances that may make it impossible to attend class, the lowest 3 quiz/participation grades will automatically be dropped from your final quiz/participation grade calculation.

Quizzes

There will be short quizzes (4 questions, multiple choice) in each class, based on the assigned reading material. These quizzes will count towards the participation part of your grade (25% of final grade). Quizzes can be given at any time during class, so make sure to be on time!

Exams – Midterms and Final

Two midterm exams will be given, each worth **25%** of your grade and one Final also worth **25%**. Exams will be based on lecture and assigned reading. You may not make up any exams (unless cleared with me beforehand). If you arrive late, you will not be given extra time to complete the exam. Exams are two-stage: The first stage is individual (80% of your total exam grade), and the second stage is group (20% of total exam grade). If you score higher on your individual exam versus your group exam, then the individual exam score is 100% of the total exam score (in other words, group exam scores can only help you, not hurt you).

Course/Student Learning objectives:

Upon successful completion of this course, students will be able to:

1. Demonstrate a familiarity with the basic vocabulary of atmospheric and climate science.
2. Explain important environmental problems related to the earth's atmosphere.
3. Describe the underlying processes related to temperature, moisture, atmospheric stability, precipitation, air pressure and winds, circulation of the atmosphere, and weather patterns.
4. Identify major cloud types and explain the phenomena of rainfall, fog, snow, sleet, and frost.
5. Define a cold and warm front and explain the processes leading to the formation of each.
6. Explain the formation of cyclones and anticyclones, tornadoes, and hurricanes.

Grade Structure

Letter	Percentage
A+	> 96.70
A	93.30-96.70
A-	90.00-93.29
B+	86.70-89.99
B	83.30-86.69
B-	80.00-83.29
C+	76.70-79.99
C	73.30-76.69
C-	70.00-73.29
D+	66.70-69.99
D	63.30-66.69
D-	60.00-63.29
F	59.99 and below

Note: percentages given are approximations and may vary

7. Identify favorable conditions for the formation of thunderstorms, and explain lightning and thunder.
8. Describe the phenomenon of El Nino-Southern Oscillation and the impacts it has on global climate and weather patterns.
9. Describe changes in Earth's climate in the past, present and future.
10. Identify the main culprits of anthropogenic climate change.
11. Differentiate between global warming and the greenhouse effect.

Disability Access:

If you have a disability or related access need, the Instructor will make every effort to assist and support you. For confidential services students are encouraged to contact the Office for Students with Disabilities (known as "KOKUA") located on the ground floor (Room 013) of the Queen Lili'uokalani Center for Student Services:

KOKUA Program • 2600 Campus Road • Honolulu, Hawaii 96822 • Voice: 956-7511 • Email: kokua@hawaii.edu www.hawaii.edu/kokua

Title IX:

The University of Hawai'i is committed to providing a learning, working and living environment that promotes personal integrity, civility, and mutual respect and is free of all forms of sex discrimination and gender-based violence, including sexual assault, sexual harassment, gender-based harassment, domestic violence, dating violence, and stalking. If you or someone you know is experiencing any of these, the University has staff and resources on your campus to support and assist you. Staff can also direct you to resources that are in the community. Here are some of your options:

As members of the University faculty, your instructors are required to immediately report any incident of potential sex discrimination or gender-based violence to the campus Title IX Coordinator. Although the Title IX Coordinator and your instructors cannot guarantee confidentiality, you will still have options about how your case will be handled. Our goal is to make sure you are aware of the range of options available to you and have access to the resources and support you need.

If you wish to remain ANONYMOUS, speak with someone CONFIDENTIALLY, or would like to receive information and support in a CONFIDENTIAL setting, use the confidential resources available here:

<http://www.manoa.hawaii.edu/titleix/resources.html#confidential>

If you wish to directly REPORT an incident of sex discrimination or gender-based violence including sexual assault, sexual harassment, gender-based harassment, domestic violence, dating violence or stalking as well as receive information and support, contact: Dee Uwono Title IX Coordinator (808) 956-2299 t9uhm@hawaii.edu.

Lectures will follow the *tentative* course outline below. *Pages are for 8th edition of the book.* This syllabus is subject to change; any changes will be disclosed in class beforehand and posted on laulima.

Week	Date	Topic	Reading (completed before class)
1	8/21	Course Syllabus, Weather and Climate Intro	Ch 1 (Pgs 4 – 9)
	8/23	Atmospheric Composition	Ch 1 (Pgs 15 – 19)
	8/25	Vertical Structure of the Atmosphere	Ch 1 (Pgs 19 – 24)
2	8/28	Temperature and Heat Transfer, Absorption, Emission	Ch 2 (Pgs 28– 39)
	8/30	Earth’s Annual Energy Balance, Seasons	Ch 2 (Pgs 42 – 52)
	9/1	Air Temperature (vertical and global)	Ch 3 (Pgs 56 – 62)
3	9/4	NO CLASS- Labor Day	
	9/6	Air Temp. Con’t Applications of Temperature Data	Ch 3 (Pgs 63 – 67)
	9/8	Air Temp. Con’t Applications of Temperature Data	<i>no required reading</i>
4	9/11	Water in the Atmosphere, Relative humidity	Ch 4 (Pgs 80 – 87)
	9/13	Dew and Frost, Fog	Ch 4 (Pgs 91 – 97)
	9/15	Cloud Types, and Identification	Ch 4 (Pgs 98 – 110)
5	9/18	Atmospheric Stability, Cloud Development	Ch 5 (Pgs 116 – 126)
	9/20	Precipitation Processes	Ch 5 (Pgs 126 – 131)
	9/22	Precipitation Types	Ch 5 (Pgs 132 – 140)
6	9/25	Midterm I (Ch 1-5)	
	9/27	Atmospheric Pressure, Why Wind Blows	Ch 6 (Pgs 148 –159)
	9/29	Surface and Vertical Winds I	Ch 6 (Pgs 159 – 165)
7	10/2	Surface and Vertical Winds II, Measuring wind	<i>no required reading</i>
	10/4	Scales of Atmospheric Motion, Local Wind Systems	Ch 7 (Pgs 174 – 187)
	10/6	Cell Models, Global Wind Patterns, Jet Streams	Ch 7 (Pgs 188 – 196)
8	10/9	Atmosphere- Ocean Interactions	Ch 7 (Pgs 197 – 205)
	10/11	Air Masses	Ch 8 (Pgs 210 – 220)
	10/13	Fronts	Ch 8 (Pgs 220 – 229)
	10/16	Mid-Latitude Cyclones	Ch 8 (Pgs 229 – 238)
	10/18	Thunderstorms & Supercells	Ch 10 (Pgs 274 – 286)
	10/20	NO CLASS-ENJOY SOEST OPEN HOUSE!	
10	10/23	Distribution of Thunderstorms, Thunder and Lightning	Ch 10 (Pgs 288 – 295)
	10/25	Tornadoes	Ch 10 (Pgs 296 – 305)
	10/27	Tornado Formation	Ch 10 (Pgs 305 – 311)
11	10/30	Hurricane Formation and Weakening	Ch 11 (Pgs 320 – 326)
	11/1	Hurricane Damage, Naming	Ch 11 (Pgs 327 – 336)
	11/3	Notable hurricanes, hurricane activity	<i>no required reading</i>
12	11/6	Midterm II (Ch 6-8,10,11)	
	11/8	Air Pollution: Types & Sources of Pollutants	Ch 14 (Pgs 418 – 426)
	11/10	NO CLASS- Veterans Day	
13	11/13	Air Pollution: Factors that affect Pollution, Urban Environment	Ch 14 (Pgs 429 – 436)
	11/15	Sky Colors, Atmospheric Optics	Ch 15 (Pgs 444 – 451)
	11/17	Mirages, Halos, Sundogs, Sun Pillars	Ch 15 (Pgs 451 – 459)
14	11/20	Reconstructing Past climates (proxies)	Ch 13 (Pgs 382 – 384)
	11/22	Past climates	Ch 13 (Pgs 384 –388)
	11/24	NO CLASS- Post-Thanksgiving Day	
15	11/27	Climate Feedbacks	Ch 13 (Pgs 388 – 390)
	11/29	Natural climate change (tectonics, orbital changes)	Ch 13 (Pgs 390 – 393)
	12/1	Natural Climate change (solar activity, volcanic eruptions)	Ch 13 (Pgs 394 – 396)
16	12/4	Anthropogenic Climate Change	Ch 13 (Pgs 397 – 405)
	12/6	Climate Change Impacts & Summary of class	Ch 13 (Pgs 406 – 410)
	12/15	FINAL EXAM	

ATTENTION: the final exam tests fundamental concepts from the entire course, and material after the second midterm.

