Synopsis and Goals
An introductory course on general meteorology and severe weather, primarily for the non-science major. The physical nature of the atmosphere will be presented in a visual and descriptive manner. Severe weather phenomena is being used this quarter as a means of learning and applying scientific principles of meteorology.

Lectures in Geology 3656
MWF 1:00–1:50 pm

Discussion Sections in MS 7124B
Wednesday 11:00, 12:00
Friday 2:00

Unless indicated during the first lecture, you must attend the discussion section in which you enroll because of limited seating in the classroom and the assignment of in-class activities. This means that you are not allowed to enroll in an open section while attending a “closed” section instead.

Resources
OPTIONAL TEXTBOOK: Aguado, E. and J.E. Burt, Understanding Weather and Climate, 7th ed. This book will be on reserve at the College Library in Powell. It can also be purchased/rented online and an e-version is available from the publisher (Pearson).

https://ccle.ucla.edu instructional material, recordings and notes. Our CCLE course website will be the repository for the primary required instructional material, such as videos and reading material.

Instructor Information
Dr. Jeffrey Lew Email: lew@atmos.ucla.edu
Mathematical Sciences 1961
(310) 825-3023

Office Hours: Mon 2:15–4:00 pm, Tue/Thu 1:00–4:00 pm in MS1961 or by appointment/drop-in

Online conference via Zoom: meeting ID 882-261-6568 or https://ucla.zoom.us/my/aosjefflew (only during scheduled in-office hours or prior appointment)

Twitter: http://twitter.com/atmosciproflew

Teaching Assistant: Mr. Matt McKinney mmckinney@atmos.ucla.edu

Grades
The final course grade will be based on the total number of points earned from:

Online website/reading assignments 150 total points
Discussion section activities 150 total points
Lecture class activities 150 total points
2 Closed-book, Non-cumulative Exams 550 total points

There is a total possible 1000 points (1200 points if the lab option is taken). The letter grade will be based on a statistical curve of the percentages earned out of a the total possible points. An approximate breakdown might look something like:

87–100% A, 74–87% B, 62–74% C, 50–62% D, less than 50% F.

Plus and minus grades are three percentage points within the top and bottom limits of each letter grade range.

In case of clerical errors, Dr. Lew should be notified as soon as possible.
Examinations

Exam #1  Monday, May 6, 2019
         1:00–1:50 pm
Exam #2  Tuesday, June 11, 2019
         12:00–2:00 pm

There will be no makeup and no alternate-scheduled (i.e., “early”) exams, unless otherwise required by the Center for Accessible Education (CAE) and by the California Education Code Section 92640(a). Please arrange your travel plans in December accordingly. Please note that exams will not be given outside of the designated venues, except those exams that are proctored by CAE.

Examinations are multiple-choice and fill-in-the-blank. Please bring a #2 pencil and photo identification. The exams are closed-book and are non-cumulative. All exams cover material from the lectures, quizzes, discussion sections, and required reading.

Reading and Online Assignments

You are responsible for material given in the lectures and for all required assignments posted in our CCLE course website. While it is preferred that the online assignments be completed before the relevant lecture class, they can be done after the lecture, up until the closing time (usually a week after the relevant lecture).

Lectures

Lectures will be for preview/review and exploration of material in the website assignments. Integrated with these discussions will be live demonstrations and some quizzing and group activities. We may or may not require a paid subscription to an audience-response system (such as Pearson’s Learning Catalytics), depending on our total enrollment. In-class activities will be documented, so bring paper and calculator to all classes (or an Internet-connected device, if we go with an audience-response system). Please note that while attendance at all lecture classes are required for the grading of the “Lecture Class Activities” category, students are allowed to miss a few classes for various reasons (“few” will be determined on a case-by-case basis; don’t abuse this provision!).

Discussion Sections

Some discussion sections will be used for review of course material in smaller groups than during the lecture period. Four of the sections will be used for group activities where students work in small groups on numerical and graphical problems and short essay questions. At least one of these activities is a weather map exercise that will be used as one of the lab assignments for students enrolled in the A&O Sci 3L lab section.

Students are required to attend a discussion section in order to get credit for the in-class activities. However, the total enrollment will probably be low enough that we can accommodate students hopping between scheduled sections without the need for a formal approval system. It is important that you check with the TA if you anticipate needing an alternate discussion time more frequently than once or twice during the quarter.

Laboratory

There is an optional 1-unit lab section (Course 3L) that, when taken, makes this course a 5-unit course that satisfies the Foundations of Scientific Inquiry General Education requirement for a physical science course with lab/demo component. If you already took one like that, you now only need a 4-unit course in physical sciences, and do not need to enroll in our lab section nor do you need to do the lab assignments.

Please note that if you want or need to have the lab/demo credit for this course, you must enroll in the 3L course during the same quarter as lecture. You will not be able to get the lab credit if you attempt to take the lab during a different quarter (there is nothing to really stop you from doing so however; it’s just that you will get an “F” for the lab).

Lab Assignments. There will be four lab assignments, some of which may be a quarter-long assignments, starting in the first or second week of classes (see list at the end of this syllabus). Some of these assignments can be just worksheets where you work out problems and write up explanations. Some of the
assignments may require the use of an instructional module that we will post on the class web site, so some kind of Internet access will be required. One or more may require environmental observations over most of the quarter.

Communication about the lab assignments. Information about the labs, availability of lab worksheets, due dates—is done by broadcasting mass email and by announcements in class and on the CCLE web site for the AOS 3L lab section (separate from the AOS 3 CCLE site). Make sure you read the broadcast emails or the announcements forum on the 3L CCLE site, or else you may miss important news about the lab assignments.

Lab grading. Each lab assignment is worth 50 points. The final course grade for the lecture and lab will be a single grade based on the points earned from the lecture section and the lab section added together (i.e., out of 1200 points). Your transcript will show two separate grades, one for the lecture and one for the lab, but they will be the same (unless you set one for letter grade and the other P/NP). The grade breakdown will be the same percentages noted for the lecture section.

You must write up your own labs. While you may collaborate with other students in the course while you work on the labs, you cannot have people not enrolled in the course help you with the labs or do the lab work for you. Students who have proxies complete their lab work or who produce fabricated data for an assignment will have the assignments put on deferred status and the case will be prosecuted by the Office of the Dean of Students.

Summary of topics to be covered (approximately by week):

1. Atmospheric structure and composition; Energy/Heat transfer and balance; Pressure forces and wind; Conservation of Angular Momentum and the Coriolis Effect; Geostrophic balance and atmospheric circulation patterns
2. Humidity: saturation, relative humidity and dew point temperature; condensation, fog and clouds
3. Cloud observations; Atmospheric stability fundamentals; Precipitation formation, rain and snow
4. Jetstreams; Rossby waves, ridges and troughs; Air masses and fronts; Cyclogenesis; Fundamentals of weather forecasting
5. Severe winter weather (blizzards and Polar Vortex events); Heat waves
6. Drought and floods (El Niño, La Niña, Atmospheric rivers), Climate change effects
7. Thunderstorms: convective stability, airmass thunderstorms, squalllines and midlatitude cyclones, supercell thunderstorms
8. Lightning, Hail, Severe thunderstorm forecasting
9. Tornadoes: structure and formation, classification, observations and forecasts
10. Hurricanes and typhoons: origin, structure, observation technology, forecasting

Lab topics (3L)

1. Cloud identification
2. Humidity observations
3. Weather map analysis
4. Weather forecasting
<table>
<thead>
<tr>
<th>Week</th>
<th>Monday</th>
<th>Wednesday</th>
<th>Friday</th>
<th>Discussion Section</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>4/1</td>
<td>4/3</td>
<td>4/5</td>
<td>Introduction of TA; review of atmospheric structure and energy balance</td>
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<tr>
<td></td>
<td>Course introduction; atmospheric temperature and pressure structure</td>
<td>Atmospheric composition; heat transfer; Pressure gradient force, conservation of angular momentum</td>
<td>Coriolis effect; geostrophic balance; synoptic and global circulation</td>
<td></td>
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<tr>
<td>2</td>
<td>4/8</td>
<td>4/10</td>
<td>4/12</td>
<td>Group activity 1: Atmospheric structure and composition</td>
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<tr>
<td></td>
<td>Water vapor saturation; relative humidity, dew point temperature</td>
<td>Humidity and temperature measurements; condensation nuclei</td>
<td>Fog and clouds</td>
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<tr>
<td>3</td>
<td>4/15</td>
<td>4/17</td>
<td>4/19</td>
<td>Review: humidity</td>
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<tr>
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<td>Atmospheric stability; cloud type observations</td>
<td>Cloud types (cont.); precipitation formation</td>
<td>Rain, snow, sleet, freezing rain; precipitation measurement</td>
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<td>4</td>
<td>4/22</td>
<td>4/24</td>
<td>4/26</td>
<td>Group activity 2: Pressure and winds</td>
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<tr>
<td></td>
<td>Jet streams; Rossby waves and vorticity, troughs and ridges</td>
<td>Air masses and fronts</td>
<td>Middle latitude cyclogenesis</td>
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<tr>
<td>5</td>
<td>4/29</td>
<td>5/1</td>
<td>5/3</td>
<td>Review for exam</td>
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<tr>
<td></td>
<td>Weather forecasting fundamentals</td>
<td>Blizzards; polar vortex events</td>
<td>Severe eastern US winter storms; Chinooks</td>
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<tr>
<td>6</td>
<td>5/6</td>
<td>5/8</td>
<td>5/10</td>
<td>No discussion section this week</td>
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<td></td>
<td>EXAM #1</td>
<td>Heat waves and Santa Ana winds</td>
<td>Drought and floods; El Niño and La Niña</td>
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<tr>
<td>7</td>
<td>5/13</td>
<td>5/15</td>
<td>5/17</td>
<td>Group activity 3: Atmospheric stability and cloud formation</td>
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<td>Atmospheric rivers; effects of climate change on unusual weather events</td>
<td>Thunderstorm weather and convective stability; airmass thunderstorms</td>
<td>Squallines, midlatitude cyclones, and mesoscale convective complexes</td>
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<td>8</td>
<td>5/20</td>
<td>5/22</td>
<td>5/24</td>
<td>Group activity 4: Weather map drawing I</td>
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<td>Supercell/severe thunderstorms</td>
<td>Lightning and thunder</td>
<td>Hail and graupel storms</td>
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<td>9</td>
<td>5/27</td>
<td>5/29</td>
<td>5/31</td>
<td>Review: thunderstorms</td>
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<td></td>
<td>Memorial Day Holiday (no classes)</td>
<td>Doppler radar and thunderstorm observations; forecasts</td>
<td>Tornado structure; formation; classification</td>
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<td>10</td>
<td>6/3</td>
<td>6/5</td>
<td>6/7</td>
<td>Group activity 5: Weather map drawing II and forecasting</td>
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<td></td>
<td>Doppler radar and tornado observations; forecasts</td>
<td>Hurricane structure and origin; classification</td>
<td>Hurricane observing; forecasting hurricanes; notable hurricane events; climate change effects</td>
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