**Course Goal and Structure:** Introduction to fundamental aspects of modern-day climate change. This course (1) develops an understanding of how and why climate is changing; (2) examines the role of humans in driving this change; (3) looks to future rates and impacts of global warming; and (4) reviews the scientific assessments of climate change.

**Grades:** Grades are determined based on class participation (10%), problem sets/labs (20%), and two examinations (35% each).

**Textbooks:** The primary text for the course is, "Introduction to Modern Climate Change", by Andrew E. Dessler. Students must also read "The Discovery of Global Warming", by Spencer R. Weart. We will also cover the IPCC (2007), Summary for Policymakers (SPM), Working Groups 1-3 (available online).

Additional material (supplementary reading) comes from the following texts:

- *Global Warming: Understanding the Forecast*, by David Archer
- *Global Warming: The Complete Briefing*, by John Houghton
- *Climate Change and Climate Modeling*, by J. David Neelin
- *Global Physical Climatology*, by Dennis L. Hartmann
- *Understanding Weather and Climate*, by Edward Aguado and James E. Burt

Below is a list of topics we will discuss.

<table>
<thead>
<tr>
<th>Week 1</th>
<th>Introduction—What is climate? Is the climate changing? Chaos, exponential growth and uncertainty</th>
<th>Ch. 1-2, 10 (Dessler)</th>
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<tr>
<td>Week 2</td>
<td>Radiation and energy balance A simple climate model Greenhouse gases The greenhouse effect</td>
<td>Ch. 3-4 (Dessler)</td>
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<tr>
<td>Week</td>
<td>Topic</td>
<td>Reading Material</td>
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</table>
| Week 3 | The carbon cycle  
Thermal structure of the atmosphere  
Air pressure and density  
Convection  
Atmospheric Stability | Ch. 5 (Dessler)  
Ch. 5 & 10 (Archer)  
Ch. 4 (Aguado & Burt) |
| Week 4 | The hydrological cycle  
Clouds and atmospheric moisture  
Atmospheric circulation and dynamics | Ch. 5-6 (Hartmann)  
Ch. 5-6, 8 (Aguado & Burt) |
| Week 5 | Weather (e.g, mid-latitude cyclones, fronts)  
Mid-term | Ch. 6 (Archer)  
Ch. 9-10 (Aguado & Burt) |
| Week 6 | Tropical storms & hurricanes  
Natural climate variability (e.g., El Nino-Southern Oscillation) | Ch. 8, 12 (Aguado & Burt)  
Ch. 7 (Dessler) |
| Week 7 | Ocean circulation  
Ozone hole | Ch. 13 (Dessler)  
Ch. 8 (Aguado & Burt) |
| Week 8 | Climate change scenarios in SoCal  
Milankovich cycles  
Paleoclimate (glacial/interglacial cycles) and climate proxies | Ch. 2, 7 (Dessler)  
Ch. 16 (Aguado & Burt) |
| Week 9 | Forcing, feedbacks, and climate sensitivity  
Emission Scenarios  
Future climate projections  
Climate modeling | Ch. 6, 8 (Dessler)  
Ch. 5 (Neelin) |
| Week 10 | Climate Impacts Adaptation & Mitigation 2°C stabilization level | Ch. 9, 11-12, 14 (Dessler) IPCC SPM Ch. 7 (Houghton) |