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SIO20: The Atmosphere (Winter 2016)

Tuesdays & Thursdays 12:30 - 1:50 in CNTR 105

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Instructors

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<https://thiscourse.com/ucsd/sio20/wi16>

Office Hours: Tues 2-3, Wed 12:30 -1:30 in Nierenberg Hall 222

Tues after class (UCSD), Wed in NH 222 (SIO). In specific weeks, office hours may be modified as needed.

Weijie Wang (TA1)

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Office Hours: Thur 3-4, Fri 2-3:30 in NH 227

Course Description

This course is an introduction to meteorology and climate. Basic physical concepts of atmospheric structure, moisture and energy are covered first followed by clouds and precipitation. Forces controlling the winds are discussed next with local and regional case studies. The second half of the course focuses on large-scale and global atmospheric dynamics, climate variability and change, as well as on their implications for regional weather. Although this material is global in scope, case studies will be selected preferentially for their relevance to our region and our personal experience, e.g. El Niño, atmospheric rivers, Santa Ana winds and coastal marine layer.

Books

Required



By C. Donald Ahrens **Essentials of Meteorology: An Invitation to the Atmosphere (7th Edition)**

C. Donald Ahrens (2014)

[Amazon](#)

Additional Readings

Course Details and Policies

Clickers are required and will be used to assess participation as well as knowledge. Please register your clickers on ICLICKER.COM

Grading will be based on the following:

- Class participation via iClicker ----- 10%
- Problem sets (total of 4 assignments) ----- 20%
- Midterm exam ----- 30%
- Final exam ----- 40%

Course Schedule



Week	Date	Topic	Readings	Assignments	Notes
-51	Tue Jan 06	Course introduction			
1	Tue Jan 05	Course Introduction			Introduction
	Thu Jan 07	Atmospheric composition, structure and energy	Ch 1, pp 2-18; Ch 2, pp 28-46		Essential concepts
2	Tue Jan 12	Seasonal and daily cycles	Ch 2, pp 46-54; Ch 3, pp 58-73		Essential concepts
	Thu Jan 14	Moisture in the atmosphere	Ch 4, pp 84-94 Ch 4, pp 98-99		Essential concepts
3	Tue Jan 19	Moisture, condensation, fog and cloud types	Ch 4, pp 100-119		Essential concepts
	Thu Jan 21	Stability and cloud development	Ch 5, pp 122-129 Ch 5, pp 130-134	Problem set 1 due	Clouds and precipitation
4	Tue Jan 26	Precipitation	Ch 5, pp 134-149		Clouds and precipitation
	Thu Jan 28	Pressure, forces and wind; <i>Local winds: breezes</i>	Ch 6, pp 156-165		Atmospheric dynamics
5	Tue Feb 02	Regional wind systems; <i>Chinook, Santa Ana and monsoons</i>	Ch 6, pp 166-181 Ch 7, pp 184-200		Atmospheric dynamics
	Thu Feb 04	Regional wind systems; <i>Severe storms</i>	Ch 10-11	Problem set 2 due	Atmospheric dynamics
6	Tue Feb	Global wind systems, ocean-land-	Ch 7, pp 200-		Atmospheric

Week	Date	Topic	Readings	Assignments	Notes
	09	atmosphere interaction, <i>jet streams</i>	213		dynamics
	Thu Feb 11	MIDTERM EXAM			
7	Tue Feb 16	Jet streams fronts and midlatitude cyclones	Ch 7, pp 200-213 Ch 8		Atmospheric dynamics
	Thu Feb 18	Midlatitude Cyclones (continued); <i>Atmospheric Rivers</i>	Ch 8	Problem set 3 due	Atmospheric dynamics
8	Tue Feb 23	<i>Santa Ana Winds</i>			Weather and climate case studies
	Thu Feb 25	<i>Coastal Marine Layer Clouds (May grey and June gloom...)</i>			Weather and climate case studies
9	Tue Mar 01	Monsoons and El Niño/Southern Oscillation (ENSO)	Ch 7, pp 198-201; Ch 7, pp 213-216		Climate dynamics
	Thu Mar 03	<i>Pacific Decadal Oscillation (PDO); Storm-tracks and Teleconnections</i>	Ch 7, 216-218	Problem set 4 due	Climate dynamics
10	Tue Mar 08	Natural climate variability and anthropogenic climate change	Ch 12		Climate dynamics
	Thu Mar 10	Climate change (continued); <i>Impacts on weather, extremes, and society</i>	Ch 13		Weather, climate and society
11	Tue Mar 15	FINAL EXAM			

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