

**Earth System Science 200: Global Physical Climatology (Fall 2020)**  
**(<http://www.ess.uci.edu/~yu/ess200.html>)**

**VIRTUAL REMOTE VIA ZOOM**

Tuesdays & Thursdays 11:00-12:20pm (10/01/2020-12/10/2020)

Join Zoom Meeting: <https://uci.zoom.us/j/93561943295>

Meeting ID: 935 6194 3295

**INSTRUCTOR**

Professor Jin-Yi Yu

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Office Hour: 1:00-2:00pm Wednesdays (at <https://uci.zoom.us/j/99675154268>)

**COURSE DESCRIPTION**

This course builds a physical understanding of Earth's climate system. An overview of Earth's climate system and energy budget. Large-scale circulations, key physical processes, and climate sensitivity of the atmosphere, ocean, land surface, and cryosphere.

**TEXTBOOKS**

Global Physical Climatology (2nd Edition), by Dennis Hartmann, Elsevier Inc. **(required)**

The Earth System (3rd Edition), by Kump et al., Prentice Hall **(optional)**

Meteorology Today (11th Edition), by Donald Ahrens, Brooks/Cole **(optional)**

**GRADES**

Homework (30%); midterm (35%); Final (35%)

**HOMEWORKS**

Issue and due every Thursday

**SYLLABUS**

Week 1	10/01	<b>Introduction to the Climate System</b> (Ch.1) Atmospheric properties and structures World Ocean, land surface, and cryosphere
Week 2	10/6 & 10/8	<b>The Global Energy Balance</b> (Ch.2) Planetary balance, greenhouse effect Global radiative energy balance, poleward energy flux
Week 3	10/13 & 10/15	<b>Atmospheric Radiative Transfer and Climate</b> (Ch.3) Solar and infrared radiation, selective absorption and emission Cloud and radiation, radiative-convective equilibrium
Week 4	10/20 & 10/22	<b>The Energy Balance of the Surface</b> (Ch.4) Surface Properties, Storage, Heating, Albedo, Emission Planetary boundary layer, drag, mixing, fluxes
Week 5	10/27 & 10/29	<b>Atmospheric General Circulation and Climate</b> (Ch.6) Zonal-mean circulation, eddies Angular momentum, moist static energy
Week 6	11/03 & 11/05	<b>The Ocean General Circulation and Climate</b> (Ch.7) Ocean properties and structures, water mass Wind-driven circulation, thermohaline circulation, and transports
Week 7	11/10 & 11/12	<b>cont.</b> (Ch.7)
Week 8	11/17 & 11/19	<b>Cryosphere</b> (Kump et al. 2016; Ch. 6) Glaciers, ice sheets, mass balance, sea-Level
Week 9	11/24	<b>Natural Intraseasonal and Interannual Variability</b> (Ch.8) Internal atmospheric variability, El Niño and the southern oscillation, Decadal variations of weather and climate
Week 10	12/01 & 12/03	<b>Climate Sensitivity and Feedback Mechanisms</b> (Ch.10) Sensitivity and feedback Water vapor, ice-albedo, cloud, dynamical
Week 11	12/08 & 12/10	<b>Natural Climate Change</b> (Ch.12) Natural solar, aerosol, volcanic forcing Past climate changes

### **SPECIAL ACCOMMODATION DUE TO THE IMPACT OF COVID**

During the 2020-21 academic year, students in this course are expected to follow the School of Physical Sciences guidelines (<https://ps.uci.edu/students>) for students in remote courses.

This is an exceptional quarter due to the impact of COVID on you, your friends, and your family. Continuing social and political unrest may add even more anxiety. For students experiencing stress, I urge you to take advantage of the many resources available to UCI students.

You are advised to take the following actions in order to avoid disruption harming your grades:

- avoid missing assignments/discussions early in the quarter so that you can make use of dropping missed/low scores later in the quarter if disruption occurs
- keep up with the class and study in order to achieve high scores in the smaller, more frequent assignments rather than waiting to study before higher stakes midterms and final exams
- communicate with your instructor as soon as possible if situations arise where you will not be able to complete assigned work

### **ON THE UNAUTHORIZED DISTRIBUTION OF COURSE MATERIALS**

The unauthorized sale or commercial distribution of course notes or recordings is a violation of campus policy.

Specifically, Section 102.23 of Policies Applying to Campus Activities, Organizations, and Students states that the following activities constitute grounds for discipline:

**“Selling, preparing, or distributing for any commercial purpose course lecture notes or video or audio recordings of any course unless authorized by the University in advance and explicitly permitted by the course instructor in writing. The unauthorized sale or commercial distribution of course notes or recordings by a student is a violation of these Policies whether or not it was the student or someone else who prepared the notes or recordings.”**