

Syllabus: Global Physical Climatology

Time: Tu/Th 2:45pm – 4:05 pm

Room: ES-232

Credits: 3

Instructor: Lance F. Bosart

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Office (ES-227) hours: Tu/Th 1:00-2:00 pm and 4:30-5:30 pm, by appointment, or open door

I. Textbooks and References:

1. Roger G. Barry and Eileen A. Hall-McKim: Essentials of the Earth's Climate System, 2014, Cambridge University Press.
2. Roger G. Barry and Richard J. Chorley: Atmosphere, Weather and Climate, Ninth Edition, 2010, Routledge Press.
3. John M. Wallace and Peter V. Hobbs: Atmospheric Science: An Introductory Survey, Second Edition (2006), Academic Press.

4. State of the Climate in 2015: (supplement to the July 2016 issue of the Bulletin of the BAMS)

(<http://journals.ametsoc.org/doi/abs/10.1175/2016BAMSStateoftheClimate.1>)*

*State of the Climate in 2016 should be available in September/October 2017

5. Monthly and annual climate summary information, and special climate reports, can be found at:

(<http://www.ncdc.noaa.gov/climate-monitoring/index.php>)

6. Federal Climate Science Special Report (draft):

(<https://www.nytimes.com/interactive/2017/08/07/climate/document-Draft-of-the-Climate-Science-Special-Report.html>)

II. Course Home Page:

- a) Go to DAES home page (<http://www.atmos.albany.edu>)
- b) Click on undergraduate students, courses, and course web pages
- c) Click on "ATM 305"
- d) Alternatively use this URL: <http://www.atmos.albany.edu/daes/atmclasses/atm305/>

III. Course Requirements:**1. Examinations (70%):**

- a) Class quiz (10%)

- b) Two class exams (40%): Dates to be announced
- c) Final exam (20%), Thursday 14 December 2017 10:30 am – 12:30 pm in ES-232

2. Homework (10%):

3. Semester Project Paper (20%) (maximum length: 1500 words) due Th 30 November 2017:

The semester project paper can be on any topic of your choice related to global physical climatology. It can be a literature review of a particular topic or an analysis of a feature of the global climate using real data obtained from the maproom, the Library, or over the Internet. The paper should be prepared in AMS journal format (details provided later). All sources, including web URLs, must be listed.

IV. Course Outline:

1. Status of the Current Climate (see sections I.4–I.6 above):
2. The Basic Ingredients:
 - a) atmospheric composition and structure
 - b) earth-atmosphere radiation balance
 - c) observed global atmospheric and oceanic circulations
3. Some Simple Statistics:
 - a) overview of basic concepts
 - c) linear regression
 - d) meteorological and climatological applications
4. Governing Dynamics and Thermodynamics:
 - a) governing equations and wind laws
 - b) principles of atmospheric motions
5. Water Vapor
 - a) precipitable water
 - b) water budget equation
 - c) global rainfall
6. The Observed Climate:
 - a) polar regions
 - b) midlatitudes
 - c) tropics
 - d) monsoon circulations
7. Natural Climate Variability of the Earth-Atmosphere System:
 - a) millennial and longer variations
 - b) interannual (e.g., ENSO) and interdecadal (e.g., PDO) variations
 - c) intraseasonal variations (e.g., the Madden-Julian Oscillation)
 - d) weather-climate interface
8. Prediction of Climate Change:
 - a) the climate record
 - b) possible causes of climate change
 - c) human influence on climate change