Syllabus: Global Physical Climatology

Time: Tu/Th 2:45pm – 4:05 pm
Room: ES-328
Credits: 3
Instructor: Lance F. Bosart
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Phone: 518-442-4564
Fax: 518-442-5825
Office (ES-227) hours: Tu/Th 1:00-2:00 pm and 4:30-5:30 pm, by appointment, or open door

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Office (ES-330) hours: We/Th 9:00 am – 11:00 am, by appointment, or open door

I. Textbooks and References:


   (http://www.ametsoc.org/SOC-2014.pdf)

5. Monthly and annual climate summary information, and special climate reports, can be found at:
   (http://www.ncdc.noaa.gov/climate-monitoring/index.php)

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%)
   c) Final exam (20%), Thursday 17 December 2015, 1:00 pm – 3:00 pm in ES-328
      (will attempt to move date forward pending unanimous class agreement)
2. **Homework (10%)**:

3. **Semester Project Paper (20%)** (maximum length: 1500 words) due **Th 3 December 2015**:

   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:**
   a) recent climate trends
   b) IPCC (2007; 2013) assessment

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