GGS 670 Fall 2017
Introduction to Atmosphere and Weather

http://estc.gmu.edu/Course/GGS670-17/

Course Information

Title: GGS 670 Introduction to Atmosphere and Weather
CRN: 73954
Time: 04:30 pm-7:10 pm, Tuesdays, 08/28-12/20/2017
Location: Exploratory Hall 2312
Instructoris: Prof. John Qu and Dr. Xianjun Hao
Telephone: (703) 993-3958 and (703)993-9322
Office: Room 2412, and room 3412, Exploratory Hall
Office Hour: Stop by 2:00-4:00PM Mondays or make appointment

Course Description

This course will introduce the students to the fundamental principles upon which the atmospheric sciences are based and to provide quantitative description and interpretation of the wide range of atmospheric phenomena with an emphasis on sub-synoptic scales (i.e. weather and regional scale climate). One of the main goals of this course is not only to provide the basic knowledge of fundamentals of the atmosphere science and weather, but also to prepare students for the science of climate. This course is designed for both science majors and non-majors taking their first course in atmosphere science. We will focus on energy meteorology in Fall 2017.

Prerequisites

College Math (such as MATH 214) and physics (such as PHYS 262), or permission of instructor.

Schedule

Week one	08/29	Introduction to Atmosphere [PPT]
Week two	09/05	The Energy Cycle (DL) [PPT] Reading: Widening of the tropical belt in a changing climate Reading: A Drier Future?
Week three	09/12	Energy Balance and Temperature [PPT]

[illegible]	[illegible]	Reading
Week four	09/19	Water in the Atmosphere [PPT]
Week five	09/26	Observing the Atmosphere [PPT]
Week six	10/03	Atmospheric Forces and Winds [PPT] Midterm
Week seven	10/10	No class (Tuesday classes do not meet because of Columbus Day)
Week eight	10/17	Global Winds [PPT] and Small Scale Winds [PPT]
Week nine	10/24	Atmosphere-Ocean Interactions: El Nino and Tropical cyclones [PPT]
Week ten	10/31	Air Masses and Fronts [PPT]
Week eleven	11/07	Extratropical Cyclones and Anticyclones [PPT]
Week twelve	11/14	Thunderstorms and Tornadoes [PPT]
Week thirteen	11/21	Weather and Climate Forecasting PPT1 PPT2
Week fourteen	11/28	Past, Present and Future Climate PPT1 PPT2 PPT3
Week fifteen	12/05	Final project presentations Albedo and Glacier Retreat Observed in Iceland by Landsat 8 Atmospheric Differences during cross calibration studies of earth observing sensors Climate Change, Lake Effect Snow, and Deer How Changes in climate impact atmosphere-ocean interactions Weather Forcast with Weather Research and Forcast model Implication Impacts of Climate Change on Food Security
Week sixteen	12/12	Final term papers

Final project

Weather and atmosphere science related final presentations and final term papers are encouraged.

Grading
Grades will be based upon your performance on the homework exercies, midterm, class attendance and final term paper and presentation. The weighted contribution of each of these utems to your final grade is:

- Homework 30%
- Midterm 30%
- Final Project 30%
- Class Attendence 10%

(A=90-100, B=80-89, C=70-79, D=60-69, F=<60)

Textbooks
Required Textbook:

"Meteorology: Understanding the Atmosphere", Fourth Edition, by Steven A. Ackerman and John A. Knox 2014, Jones & Bartlett Learning (2014), ISBN 978-1-284-02737-2 (paperback edition), 575 pages.

Recommended References:

1. Wallace, J. M., and P. V. Hobbs, Atmospheric Science: An Introductory Survey (Second Edition), Academic Press, 2006.

Useful Links

Useful Links

1. NOAA/CDC
2. NOAA/NCDC
3. IPCC
4. Climate Conference in Copenhagen, 2009
5. Global Climate Change Impacts in the United States
6. Climate Change Science Compendium 2009 by UNEP
7. IPCC 2007 Reports
8. A climate threat, rising from the soil
9. Global Weather Maps
10. COP21