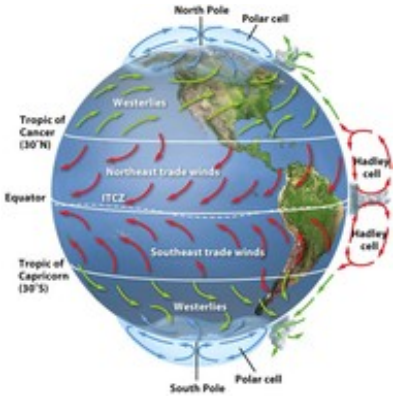
GGS 670 Spring 2021
Introduction to Atmosphere and Weather



Course Information:

Title: Introduction to Atmosphere and Weather
CRN: 18675
Time: Online synchronous 10:00AM-12:30 (ET), Wednesdays, 01/25-05/10/2021
& online asynchronous
Instructor: Prof. John Qu (jqu@gmu.edu)
Telephone: (703) 993-3958
Office hours: 12:30-1:00PM (ET, virtual), Wednesdays 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, important in our Erath system, but also to prepare students for the science of climate and climate change. This course is designed for both science majors and non-majors taking their first course in atmosphere science. We will focus on atmosphere and climate change in Spring 2021.

Prerequisites

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

Final project:

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

Grading:

Grades will be based upon your performance on the homework exercises, midterm, class participation and final term paper and presentation. The weighted contribution of each of these items to your final grade is given below:

Homework 30%

Midterm 30%

Final Project and Term Paper 35%

Class participation 5 %

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

Textbook:

Required Textbook:

1. Understanding Weather and Climate, Seventh Edition, 2015, by Edward Aguado and James E. Burt, Pearson (ISBN-13: 978-0321987303 and ISBN-10: 0321987306, ISBN-13: 9780133943641 (eText), 570 pages.

Suggested Reference Books

2. "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
3. Climate Change and Sustainable Earth by John J. Qu and Raymond Motha, Cambridge Scholars Publishing, 2021.
4. Wallace, J. M., and P. V. Hobbs, Atmospheric Science: An Introductory Survey (Second Edition), Academic Press, 2006.
5. Reference book: "Climatology", By Robert V. Rohli, Anthony J. Vega, Jones & Bartlett Learning (2011), Paperback - 432 pages - ISBN 0763791016
6. What We Know about Climate Change, Updated Edition, (2018) Kerry Emanuel, MIT Press, ISBN: 9780262535915

Honor code:

Students must follow the GMU Scholastic Honor Code. To promote a stronger sense of mutual responsibility, respect, trust, and fairness among all members of the George Mason University community and with the desire for greater academic and personal achievement, we, the student members of the university community, have set forth this honor code: Student members of the George Mason University community pledge not to cheat, plagiarize, steal, or lie in matters related to academic work. Copying homework, or mid-term or quiz is considered cheating.

Detailed Schedule

Week 1	Introduction to the Atmosphere
Week 2	Solar Radiation and the Seasons
Week 3	Energy Balance and Temperature
Week 4	Atmosphere Pressure and Wind
Week 5	Atmosphere Moisture
Week 6	Cloud and Precipitation
Week 7	Atmospheric Circulation and Pressure Distributions **Mid-term (online)**
Week 8	Air Masses, Fronts, and Midlatitude Cyclones
Week 9	Lightning, Thunders, and Tornadoes
Week 10	Tropical Storms and Hurricanes
Week 11	Weather Forecasting and Analysis
Week 12	Human Effects on the Atmosphere
Week 13	Earth Climate
Week 14	Climate Changes: Past, Present and Future
Week 15	Student Final Presentations
Week 16	Final Project Term Paper and Presentation (due)