

GGG 670 Fall 2023

Introduction to Atmosphere and Weather

Course Information:

Title: GGG 670 Introduction to Atmosphere and Weather
CRN: 21783
Time: 04:30 pm-5:45 pm, Tuesdays+ Online (TBD) 01/23-05/17/2023
Location: Exploratory Hall 2312
Instructors: [Prof. John Qu](#)
Telephone: (703) 993-3958
Office: Room 2412, and Room 3409 Building: Exploratory Hall
Office Hour: Stop by 2:00-4:00PM Thursdays 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 and related climate change.

Prerequisites

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

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 exercises, midterm, class attendance and final term paper and presentation. The weighted contribution of each of these items to your final grade is given below:

Homework 30%

Midterm 25%

Final term paper 35%

Class attendance 10%
(A=90-100, B=80-89, C=70-79, D=60-69, F=<60)

Textbook:

Required Textbook: None

Recommended References:

- 1: Wallace, J. M., and P. V. Hobbs, Atmospheric Science: An Introductory Survey (Second Edition), Academic Press, 2006.
2. Ackerman, A. Steven and John A. Knox “Meteorology: Understanding the Atmosphere”, Fourth Edition, by 2014, Jones & Bartlett Learning (2014), ISBN 978-1-284-02737-2 (paperback edition), 575 pages
3. Qu, J.J. and R. P. Motha, Climate Change and a Sustainable Earth, 2022, Cambridge Scholars Publishing (<https://www.cambridgescholars.com/product/978-1-5275-8044-2>)

Detailed Schedule

Week one	Introduction to the Atmosphere
Week two	The Energy Cycle
Week three	Energy Balance and Temperature
Week four	Water in the Atmosphere
Week five	Observing the Atmosphere
Week six	Atmospheric Forces and Winds
Week seven	Global and Small Scale Winds Mid-term
Week eight	Atmosphere-Ocean Interactions: El Niño and Tropical Cyclones
Week nine	Air Masses and Fronts
Week ten 10/30	Extratropical Cyclones and Anticyclones
Week eleven	Thunderstorms and Tornadoes
Week twelve	Weather and Climate Forecasting
Week thirteen	Past, Present and Future Climate
Week fourteen	Final project presentations
Week fifteen	Final term papers (due)