

# GG309 Fall 2019

## Introduction to Weather and Climate



### Course Information

Title: Introduction to Weather and Climate(GGS 309)

CRN: 81221

Time: 10:30am-11:45am, Mondays and Wednesdays, 08/26/2019-12/18/2019

Location: Room 2312, Exploratory Hall

Instructor: Prof. John J. Qu, and Guest speaker Dr. Ray Motha

Telephone: (703) 993-3958

Office: Room 2412, Exploratory Hall

Office Hour: Stop by Mondays or Thursdays 1:30-2:45PM or make appointment

### Course Description

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

**Prerequisites:** MATH 214 and PHYS 262, or permission of instructor.

### Schedule

Week one: 08/26	Introduction to the Atmosphere and Climate Science
Week one: 08/28	The Energy Cycle
Week two 09/02	No class-Labor Day

Week two 09/04	Temperature
Week three 09/09	Independent Reading
Week three 09/11	Weather and Climate Impacting on Agriculture and Food Security (Guest speaker: Dr. Ray Motha)
Week four 09/16	Water in the Atmosphere ( <b>Quiz One</b> )
Week four 09/18	Observing the Atmosphere ( <b>DL</b> )
Week five 09/23	Atmospheric Forces and Wind
Week five 09/25	Global Scale Winds ( <b>Quiz Two</b> )
Week six 09/30	Atmosphere-Ocean Interactions: El Niño and La Nina
Week six 10/02	Air Masses and Fronts
Week seven 10/07	Extratropical Cyclones and Anticyclones
Week seven 10/09	Thunderstorms and Tornadoes
Week eight 10/14	<b>Mid-term</b>
Week eight 10/16	Small Scale Winds
Week nine 10/21	Weather Forecasting
Week nine 10/23	Introduction to Climatology ( <b>Quiz Three</b> )
Week ten 10/28	Climate System: Control of Climate
Week ten 10/30	Climate Classification
Week eleven 11/04	Past and Present Climates
Week eleven 11/06	Human Influences on Climate
Week twelve 11/11	Effects on Climate System
Week twelve 11/13	Climate Change and Variability
Week thirteen 11/18	Past and Present Climates
Week thirteen 11/20	Climate Forecasting ( <b>Quiz Four</b> )
Week fourteen 11/25	Reviewing for final exam
Week fourteen 11/27	Thanksgiving Break
Week fifteen 12/02	Independent reading
Week fifteen 12/04	<b>Final Exam</b>

## Grading

- Class attending: 5%
- Quizzes: 20%
- Homework: 20%
- Midterm: 25%
- Final Exam: 30%

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

## Textbooks

1. 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.
2. Reference book: "Climatology", By Robert V. Rohli, Anthony J. Vega, Jones & Bartlett Learning (2011), Paperback - 432 pages - ISBN 0763791016

## Honor code

Students must follow the GMU Scholastic Honor Code. Please show respects to everyone in the classroom. Copying homework (or quiz) is considered cheating.