

Course Syllabus

MEA 215 – Introduction to Atmospheric Sciences (temporary course number MEA 493 001)

Section 001

SPRING 2016

4 Credit Hours

Special Notes

Class materials including selected lecture slides, quizzes, written exam answers, lab answers and other materials will be posted to <http://moodle.wolfware.ncsu.edu/>

Instructor's commitment. You can expect your instructor to be courteous, respectful, and punctual; be well organized and prepared for lecture and other class activities; answer questions clearly and in a positive fashion; be available for office hours or notify you beforehand if they are unable to keep them; provide email notice when class is cancelled, provide a suitable guest lecturer when they are on travel status, and grade uniformly and consistently according to the posted guidelines.

Consulting with faculty. We strongly encourage you to discuss academic questions with the instructor during office hours.

Test and lab grading. The responsibility for grading tests and labs resides with the instructor and TAs. If you believe an error has been made in grading on an assignment or exam, prepare a written statement making your case and take it or email it to the instructor. Requests to reexamine grading will only be accepted *within 2 weeks* of the assignment being returned.

Course Description

This course is designed for beginning meteorology majors and other science and engineering majors interested in meteorology. Knowledge of high school-level algebra, geometry, trigonometry, chemistry and physics is required. Students should have basic computer usage skills including web browsers and email. This course introduces students to the major concepts in atmospheric sciences and lays the foundation for more advanced courses.

Learning Outcomes

Student learning outcomes: By the end of the course you should be able to do the following things:

Specialist Vocabulary: Recognize and define the major terms that apply to meteorology. Explain the difference between weather and climate.

Structure of the atmosphere: Explain the chemical composition and vertical structure of the atmosphere.

Weather maps: Read, interpret and plot station information from weather maps. Read, interpret and plot isotherms and isobars. Determine wind direction and relative magnitude from maps of atmospheric pressure.

Stability: Explain the characteristics of atmospheric profiles in stable, unstable and conditionally unstable conditions and the associated motion of air parcels within each type of profile. Identify the lifting condensation level and temperature inversions from atmospheric sounding data. Given a thermodynamic profile, identify layers in the atmosphere where clouds can form.

Moisture: Define and calculate derived moisture parameters such as dew point, specific humidity, and mixing ratio from measured atmospheric variables.

Precipitation: Explain the physical processes that form rain, snow, hail, and freezing rain.

Weather variability: Identify and explain how the diurnal cycle influences local weather variability. Identify and explain the difference between warm and cool ENSO cycles and how these influence regional weather.

Storms: Explain the main 3D wind and precipitation structures within mid-latitude cyclones, thunderstorms and hurricanes, the environments in which they form, and key ways in which these types of storms differ. Describe storm conditions where severe weather can occur and explain safety precautions for severe weather watches and warnings.

Climate and Climate Change: Explain characteristics of current climate zones and how zone locations may shift in a changing climate. Explain evidence for climate variations. Explain likely future climate impacts on ecosystems and infrastructure.

Computation: Download data and programs from an ftp site. Use Matlab to: Read in 1d and 2d data sets. Use supplied functions to plot x-y graphs, time series graphs, 2D arrays, vectors and bar plots. Utilize algebraic functions to transform data.

Teamwork: Work effectively in problem-solving teams.

Course Structure

Lecture twice a week (Tuesday and Thursday 1:30pm – 2:45pm)

Lab once a week (attend only the lab section you are enrolled for)

Instructors

Sandra Yuter (seyuter) - *Professor*

Email: seyuter@ncsu.edu

Phone: 919 513 7963

Office Location: Rm 5145, Jordan Hall

Office Hours: Tuesday, 1030-1130 am and by appointment.

Nicole Corbin- *Teaching Assistant*

Email: nacorbin@ncsu.edu

Office Location: Jordan 5144

Office Hours: **Monday 230 pm-330 pm** and by appointment.

Allison Michaelis-*Teaching Assistant*

Email: acamras@ncsu.edu

Office Location: Jordan 1131

Office Hours: **Wednesday 1030-1130 am** and by appointment.

Course Meetings

	Date	Time	Location	Comment
Lecture	Tue and Thu	1:30 pm – 2:45 pm	Main Campus, Rm 1108, Jordan Hall	<i>This meeting is required.</i>
Students are required to enroll for and attend one of the following labs				
Lab 201	Wed	9:35 am – 12:20 pm	Main Campus, Rm 5214, Jordan Addition	
Lab 202	Fri	1:30 pm – 4:15 pm	Main Campus, Rm 5214, Jordan Addition	

Course Materials

Textbooks

Meteorology Today - *C. Donald Ahrens and Robert Henson*

Edition: 11th

Cost: \$187 (new), Also available as a rental textbook and an eTextbook. *This textbook is required.* Note that the 10th edition is similar but not identical. Class assessments will be based on the 11th edition.

Expenses

None.

Materials