

GLY 371: Meteorology

Spring 2009 4 credit hours

Dr. David Barclay: Office: 324 Bowers, (607) 753-2921
E-mail: david.barclay@cortland.edu
Course webpage in the SUNY Cortland eLearning system

Office hours: M 11:30 am - 1:30 pm; T, W, R 11:30 am - 12:30 pm
or by appointment, or at other times if I am available.

Lecture: 339 Bowers; MWF, 10:20 - 11:10 am

Laboratory: 339 Bowers; W, 12:40 - 3:30 pm

Textbook: Aguado & Burt, 2007, Understanding Weather & Climate, 4th. ed.

Catalog course description:

“Atmospheric processes, weather and climate. Application to weather forecasting, severe weather phenomena, atmospheric pollution and global climate change. Three lectures, one three-hour laboratory. Prerequisite: Six hours of mathematics or science. (4 cr. hr.)”

Course attendance policy:

I expect you to attend all lecture and laboratory sessions. Please familiarize yourself with official college policy regarding attendance and absences (Section 410.12 of the College Handbook).

Be responsible for your own education. If you miss a class, get the notes from a colleague before the next class. If you miss an exam, you must contact me as soon as possible with a valid reason for your absence or you will receive a zero for that exam. Ask questions and get involved in class discussions; your participation and attitude will be used to aid final grade determinations for borderline situations.

Academic integrity:

I expect you to abide by the SUNY Cortland standards of academic integrity (Chapter 340 of the College Handbook). Stated simply, this means that you will not commit plagiarism, nor cheat on exams, nor help others plagiarize or cheat.

Academic accommodations:

If you are a student with a disability and wish to request accommodations, please contact the Office of Student Disability Services located in B-40 Van Hoesen Hall or call (607) 753-2066 for an appointment. Information regarding your disability will be treated in a confidential manner. Because many accommodations require early planning, requests should be made as early as possible.

Course objectives:

Meteorology is the study of the atmosphere and its phenomena. This encompasses both weather (= current conditions) and climate (= averages and extremes). In this course we will consider the physical properties of the atmosphere, and then apply that knowledge to typical weather experienced through the year in the United States. In the last third of the course we will consider societal concerns such as severe weather, atmospheric pollution and climate change.

By the end of this course I expect you to be able to do the following (the lectures and assignments that specifically address each objective are in italics; numbers following each course objective are NYSED Sub Area standards):

1. Describe the structure, composition and history of the atmosphere. [0013]
Lectures in late January.
2. Explain energy transfer to and through the atmosphere. [0013, 0014, 0023]
Lectures in late January and early February.
3. Relate insolation, seasons and climate to Earth - Sun geometry. [0008, 0009]
Lectures in late January, early February, and Labs 2 and 3.
4. Relate the climate of a region to its controlling factors. [0013, 0014, 0017]
Lectures in February and Lab 3.
5. Explain the phases, effects, sources and fate of atmospheric water. [0014, 0023]
Lectures and labs throughout the course.
6. Explain how and why air circulates at local and global scales. [0013, 0015]
Lectures in March, and Labs 7 and 8.
7. Explain weather forecast types and their respective limitations. [0001, 0015, 0016]
Lectures in March and April.
8. Explain the occurrence and social impacts of severe weather events. [0002, 0016]
Lectures in April, and Labs 12 and 13.
9. Explain the causes and social impacts of atmospheric pollution and climate change. [0002, 0005, 0018]
Lectures in late April and early May, and Lab 14.
10. Collect weather and climate data in the field and from the Internet. [0001, 0004, 0007, 0015]
Labs 4, 6 and 10.
11. Analyze and interpret weather and climate data on maps and graphs. [0004, 0006, 0015, 0016]
Labs 3, 4, 5, 8, 9, 10, 12 and 13.
12. Analyze, model and interpret weather and climate data using hand calculations and computers. [0001, 0004, 0006]
Labs 2, 4, 5, 7 and 8.

Assessment of course objectives:

Graded work:	Course objective:											
	1	2	3	4	5	6	7	8	9	10	11	12
Exam 1	✓	✓	✓	✓	✓							
Exam 2		✓			✓	✓						
Exam 3		✓			✓		✓	✓	✓			
Lab. 3		✓	✓	✓						✓	✓	
Lab. 4					✓					✓	✓	✓
Lab. 6										✓	✓	
Lab. 10					✓	✓	✓			✓	✓	✓
Lab. 12					✓	✓		✓			✓	

SUNY Cortland Conceptual Framework:

This course addresses Learning Outcomes 2 and 11 of the SUNY Cortland Conceptual Framework. Specifically, students will develop in-depth knowledge of the science of Meteorology, and will learn how to use the Internet to locate and interpret data relating to weather and climate.

Evaluation of student performance:

There will be three exams spaced equally through the semester (see course schedule). Questions on all exams will be drawn from material covered in lecture and lab since the previous exam. Exams will be multiple-choice and short answer questions, and exam 2 will also include cloud identification slides. The average of these exams will comprise 60% of your final grade.

Exercises, quizzes, assignments and papers from lab and homework are an integral part of this class, and will complement and expand upon material covered in lecture. The average of these will form 40% of your final grade.

A+ = 97-100	B+ = 87-89	C+ = 77-79	D+ = 67-69	E = 0-59
A = 93-96	B = 83-86	C = 73-76	D = 63-66	
A- = 90-92	B- = 80-82	C- = 70-72	D- = 60-62	

Reading assignments:

Recommended reading assignments, including some online sources, for every class are posted on the course website (in the SUNY Cortland eLearning site). This reading list will be updated regularly so please keep checking back throughout the semester.

Laboratory equipment:

Please bring a scientific calculator, a 12" ruler, a sharp pencil, a red pen or pencil, a blue pen or pencil, an eraser, your textbook and your CD-ROM to every lab.

Fieldwork equipment:

Some labs (see schedule) will involve you collecting data outside. Please dress appropriately (warm coat, hat, and gloves/mittens) on these dates.

Course schedule and activities: (tentative)

	<u>Lecture (10:20 - 11:10 am)</u>	<u>Laboratory (12:40 - 3:30 pm)</u>
01	Wed 21 Jan.	Atmospheric structure
02	Fri 23 Jan.	Atmospheric evolution & composition
03	Mon 26 Jan.	Energy & radiation
04	Wed 28 Jan.	Insolation & seasons
05	Fri 30 Jan.	Beam depletion & energy balance
06	Mon 2 Feb.	Temperature
07	Wed 4 Feb.	Climates
08	Fri 6 Feb.	Climates 2
09	Mon 9 Feb.	Moisture, chinooks & lake effects
10	Wed 11 Feb.	Atmospheric moisture
11	Fri 13 Feb.	Lapse rates
12	Mon 16 Feb.	Fogs & lifting
13	Wed 18 Feb.	Atmospheric stability
14	Fri 20 Feb.	Data collection
15	Mon 23 Feb.	EXAM 1
16	Wed 25 Feb.	Clouds
17	Fri 27 Feb.	Precipitation
18	Mon 2 Mar.	Satellites & radar
19	Wed 4 Mar.	Pressure
20	Fri 6 Mar.	Wind
-	Mon 9 Mar.	SPRING BREAK
-	Wed 11 Mar.	SPRING BREAK
-	Fri 13 Mar.	SPRING BREAK
21	Mon 16 Mar.	Global circulation
22	Wed 18 Mar.	Local winds
23	Fri 20 Mar.	ENSO, PDO & AO
24	Mon 23 Mar.	Air masses & fronts
25	Wed 25 Mar.	Mid-latitude cyclones
26	Fri 27 Mar.	MLCs; Forecasts
27	Mon 30 Mar.	Forecasts 2
28	Wed 1 Apr.	Forecasts 3
29	Fri 3 Apr.	EXAM 2
30	Mon 6 Apr.	Lightning
31	Wed 8 Apr.	Thunderstorms
32	Fri 10 Apr.	Thunderstorm winds
33	Mon 13 Apr.	Tornadoes
-	Wed 15 Apr.	Tornado safety
34	Fri 17 Apr.	SCHOLARS' DAY
35	Mon 20 Apr.	Hurricanes
36	Wed 22 Apr.	Hurricane impacts
37	Fri 24 Apr.	Hurricane forecasts
38	Mon 27 Apr.	Inversions & smog
39	Wed 29 Apr.	Natural climate change
40	Fri 1 May	Ice ages
41	Mon 4 May	Global warming
42	Sat 9 May	EXAM 3 @ 1pm