

**ESC 1400G –Sections 10, 11, 12**  
**Weather and Climate**  
**Fall 2006**

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Office hours:  
M: 1:00-3:00 pm  
T: 9:00 am -11:00 am  
W: 1:00-3:00 pm

For the most part, if I am in my office, consider it an office hour. If, however, you would like to schedule a specific time outside of these hours, please talk to me after class or email me.

Lecture: T-R, 4:00 – 5:15 PM, 3040 Physical Science

Lab times: M, W, F 10:00 – 11:40 AM, 2060 Physical Science (*make sure you come to the correct lab section!*)

**General course information**

Required texts

*The Atmosphere*, 9th edition, Lutgens and Tarbuck

*Weather and Climate Laboratory Manual*, Gutowski and Wise - N.B.: the lab manual must be purchased by the first week of lab (2<sup>nd</sup> week of classes). Cost will be \$8, (cash, or check payable to **GTU**).

**Web sites**

Publisher's web site for the book: [http://wps.prenhall.com/esm\\_lutgens\\_atmosphere\\_9](http://wps.prenhall.com/esm_lutgens_atmosphere_9)

Course web site for notes: May be added later

**Scope of Course**

During this course, I hope that you'll gain an appreciation of science and the world around us - specifically how weather and climate can, and does, relate to your life and the community. Everyone should be able to discuss, and give examples of their significance to our everyday life and why they're important. There are a number of climatological issues that will affect the way you live the rest of your life, such as natural hazards from severe weather, air pollution, and global warming. I want you to be able to critically assess these issues, their causes, and their impact on society.

**Students with Disabilities (Whether learning, physical, psychiatric, or sensory)**

Eastern Illinois University promotes equal educational opportunities for students with disabilities. If you have a disability and may need any assistance, please notify your instructor and make an appointment immediately with the Office of Disability Services (9th Street Hall, or Office Phone: 581-6583, Voice TTY: 581-6583, Fax: 581-7208, or <http://www.eiu.edu/~disabltly>)

**Make ups, Missed, and Late Assignments:**

“Make-ups” for missed quizzes, assignments, exams, labs, etc. will only be given for "accepted" absences such as illness with a doctor's note, or an athletic event with a letter from your coach. If a “make up” is allowed, discuss the reason with me ahead of time, not after the fact – *Notification regarding absence from an exam must occur prior to the regularly scheduled exam*. Documentation of the absence (e.g. a doctor's note) must be provided prior to the time of the scheduled make-up exam. Lab assignments are due one week from when they are assigned and late lab assignments will be not be accepted!!!

**Classroom policy**

You are in this class to learn, so disruptions will not be tolerated. Not only is this disruptive to me, but more importantly, it is also disruptive to your fellow classmates. With this in mind, I ask that you arrive to the class on time and that there are no classroom conversations or other distractions. If you must talk, please take it outside, or I will ask you to do so. Pagers, beepers, or cell phones are not allowed to ring in class.

**Attendance policy:** Required. Attendance is not only required by the University, it is absolutely necessary to succeed in this class.

**Academic Integrity:**

Cheating and plagiarism will not be tolerated. If you are caught cheating on an exam, lab, quiz, or other assignment, you will receive an “F” for the final grade in the course. Exams are the property of the instructor. If exams are not returned to me, they will be considered stolen. This also is considered a violation of academic integrity and grounds for failing the course.

**Grading:** Grades in this course will be based on a number of different criteria. While it is certainly possible to “achieve” a “D” or “F”, typically students who have received those grades in the past either missed a test and/or did not come to class regularly. Class attendance is necessary if you want to do well in this course!!! Requests for grades can only be made in person, so keep track of your points throughout the semester.

**Labs:** 120 points. Labs will cover the basics of weather and climate beginning with the metric system and progress through general variables (temperature, pressure, etc.) and maps to specific map-based problems. There will be twelve (12) labs that are worth ~21% of your grade total. Again, labs are due one week after we begin them and late labs will not be accepted. You should read the lab manual before coming to lab each week - certain labs require calculators or colored pencils.

**Homework:** 70 points. Homework will supplement lecture and/or laboratory material and may consist of one to three assignments. Homework is worth ~12 % of your grade. More information will follow later.

**Questions of the Day:** 30 points. Ten times during the semester, Questions of the Day will be asked at the end of class. As such, they cannot be made up. The questions will concern some aspect of that day's lecture. Total value is ~5% of your grade.

**Lecture Quizzes:** We have six (6) scheduled thirty (30) point quizzes. These will be a combination of multiple choice or short answer questions, and you may be required to draw or label diagrams. Quizzes typically have ~15 questions on them. **Only the 5 highest grades will count toward your final quiz (and class) score!** These are worth ~26% of your total grade. See the syllabus for quiz dates.

**Midterm Examination:** 100 points. The midterm will have the same format as the quizzes but will be approximately two - three times longer in the number of questions asked. This may include ideas presented in lab. The midterm is scheduled for *Thursday, 12 October*. This exam is worth ~18% of your total grade.

**Final Examination:** 100 points. The final examination will have the same format as the mid-term examination and will primarily cover material presented during the second half of the course. This may include ideas presented in lab. The final exam will last two hours and is scheduled for *Tuesday, December 12 from 5:15 – 7:15 PM*. This exam is worth ~18% of your total grade.

Assignment	Points	Total
Labs	10 pts. each	120
Homework	70 pts.	70
Questions of the Day ( x 10)	3 pts. each	30
Quizzes ( x 5 highest)	30 pts. each	150
Midterm Exam	100 pts.	100
Final Exam	100 pts.	100
<b>Total</b>		<b>570</b>

The grading scale will be approximately 90 – 80 – 70 – 60, e.g., if you have greater than 510 points then you would earn an A, and so forth. Here’s the breakdown:

- 90% - 100% = A
- 80% - 89% = B
- 70% - 79% = C
- 60% - 69% = D
- 0 - 59% = F

### Tutoring

The Geoscience Club, composed of geology and geography members, has held free tutoring sessions in the past. If they do so again this semester, I will let you know. The members are very good at reviewing concepts covered in class and can also help you if you are having difficulties in lab.

### Class Schedule (tentative and subject to change)

Assignments should be completed before class - read the chapters and review the labs. Homework due date(s) will be given in class and are not listed below.

<u>Week</u>	<u>Date</u>	<u>Day</u>	<u>Topics</u>	<u>Assignment</u>	<u>Lab</u>
1	8/22	Tuesday	Introduction, origin and composition of the atmosphere.	Chapter 1, Appendix A	<i>No lab!</i>
	8/24	Thursday			
2	8/29	Tuesday	Heating of the Earth and Atmosphere; <b>Quiz 1 on 8/31</b>	Chapter 2	Lab 1
	<b>8/31</b>	<b>Thursday</b>			
3	9/5	Tuesday	Heat and temperature	Chapter 3	Lab 2; <i>no Monday lab (Labor Day)</i>
	9/7	Thursday			
4	9/12	Tuesday	Moisture and atmospheric stability; <b>Quiz 2 on 9/14</b>	Chapter 4	Lab 3
	<b>9/14</b>	<b>Thursday</b>			
5	9/19	Tuesday	Forms of Condensation	Chapters 5, 6, 7	Lab 4
	9/21	Thursday			
6	9/26	Tuesday	Air pressure and wind (cont.); <b>Quiz 3 on 9/28</b>	Chapters 5, 6, 7	Lab 5
	<b>9/28</b>	<b>Thursday</b>			
7	10/3	Tuesday	Air masses and fronts, Weather Patterns	Chapters 7, 8, 9	Lab 6
	10/5	Thursday			
8	10/10	Tuesday	Weather Patterns (cont.)	Chapters 8, 9	Lab 7; <i>no Friday lab (Fall Break)</i>
	<b>10/12</b>	<b>Thursday</b>	<b>Midterm Examination</b>		
9	10/17	Tuesday	Thunderstorms and tornadoes	Chapter 10	Lab 8
	10/19	Thursday			
10	10/24	Tuesday	Hurricanes; <b>Quiz 4 on 10/26</b>	Chapter 11	<i>Friday lab only!</i>
	<b>10/26</b>	<b>Thursday</b>			
11	10/31	Tuesday	Hurricanes (cont.)	Chapter 12	Lab 9
	11/2	Thursday	Weather Analysis and Forecasting		
12	11/7	Tuesday	Air Pollution; <b>Quiz 5 on 11/9</b>	Chapter 13	Lab 10
	<b>11/9</b>	<b>Thursday</b>			
13	11/14	Tuesday	Paleoclimatology	Chapter 14	<i>Monday lab only!</i>
	11/16	Thursday			
14	<b>11/21– 25</b>	<b><i>No classes – Thanksgiving Break</i></b>			
15	11/28	Tuesday	World climates; <b>Quiz 6 on 11/30</b>	Chapter 15	Lab 11
	<b>11/30</b>	<b>Thursday</b>			
16	12/5	Tuesday	Optical phenomena	Chapter 16	Lab 12
	12/7	Thursday			
17	<b>12/12</b>	<b>Tuesday</b>	<b>Final Examination 5:15 – 7:15 PM</b>		

## Things to Know:

### General / Lab:

- Be able to give the meanings (definitions) of important weather and climate terms as well be able to use them correctly; breaking a word down into its parts will be useful
- Be able to do basic calculations (especially useful for temperatures and stability problems)
- Understand concepts presented in lab – if you don't ask!
- Understand the fundamentals of weather and climate maps and weather analysis

### Chapter 1:

- Chemical composition of the atmosphere with percentages
- Major greenhouse gases
- Evolution of the atmosphere
- Thermal and compositional structure of the atmosphere with heights
- Importance of each part of the atmosphere

### Chapter 2:

- Earth-Sun relations, season, solstices and equinoxes
- Energy
- Heat transfer
- Distribution of solar radiation (heat budget)
- Greenhouse Effect and global warming

### Chapter 3:

- Temperature variations (geographic, temporal, etc.)
- Temperature distribution
- Thermometers
- Heating and cooling degree days

### Chapter 4:

- Water cycle
- Humidity and its measurement and relationship to temperature
- Adiabatic temperature changes
- Mechanism for the lifting of an air parcel
- Types of atmospheric stability and what cause each type and what happens during each type

### Chapter 5:

- Forms of condensation and precipitation
- Cloud formation processes
- Cloud nomenclature
- Fog nomenclature and formation (both general and specific fogs)
- Bergeron Process
- Collision-coalescence Process
- Types of precipitation
- Measuring precipitation
- Weather modification

### Chapter 6:

- Air pressure and its variations
- Factors effecting the direction and strength of wind
- Coriolis Force
- Cyclonic and anticyclonic flow
- Wind measurement

### Chapter 7:

- Scale of atmospheric circulation
- Special, local, winds
- Global circulation (single vs. multicell zonation)
- Circulation belts
- Monsoons
- Westerlies
- Jet streams
- El Niño and La Niña
- Global precipitation

### Chapter 8:

- Air masses and source regions

- Classification of air masses
- Air mass interactions and modification
- North American air masses
- Lake effect snow/rain

Chapter 9:

- Fronts
- Life cycle and characteristics of midlatitude cyclones
- Cyclone formation
- Divergence and convergence

Chapter 10:

- Thunderstorm classification and formation
- Lightning and thunder (formation and distances)
- Tornadoes; classification (Fujita Scale), formation, occurrence, forecasting, safety

Chapter 11:

- Birth, life, and death of a hurricane
- Hurricane (*sensu lato*) classification (Saffir-Simpson scale), occurrence, forecasting, and safety

Chapter 12

- Weather forecasting methods

Chapter 13

- Air pollution (types, sources, problems, remedies)

Chapter 14

- Paleoclimatology (evidence, causes, implication, forecast; Greenhouse Effect, global warming)

Chapter 15

- World Climates (Koppen classification, controls)

Chapter 16

- Optical phenomena