Introduction to Atmospheric Science Syllabus
ATMO 1300 – Section 001
Summer II 2017

General Class Information
Meeting time: Section 001: MTWThF 10:00 AM – 11:50 AM
Classroom: Media and Communication, Room 0057 (MCOM 0057)
Textbook: *Meteorology: Understanding the Atmosphere* (4th Edition) by Steven A. Ackerman and John A. Knox. (Required)
Website: http://www.atmo.ttu.edu/ahill/atmo1300/index.html (TTU Blackboard for grade posting)

Instructor Information
Name: Aaron Hill
Office: Media and Communications, Room 1117 (11th floor of MCOM tower)
Office Hours: Monday/Wednesday, 1:00 PM – 3:00 PM or by appointment via email
Email: aaron.hill@ttu.edu (preferred method of communication)
Phone: 806-834-3113 (Atmospheric Science Office)

Core Curriculum
ATMO 1300 is a Core Curriculum course in the Natural Sciences. The objective of the study of the natural sciences component of a core curriculum is to enable the student to understand, construct, and evaluate relationships in the natural sciences, and to enable the student to understand the bases for building and testing theories. The natural sciences investigate the phenomena of the physical world.

Course Purpose
This course presents a survey of atmospheric properties and physical processes that determine current weather and long-term climate trends. The purpose of ATMO 1300 is to enhance the student's general knowledge in the realm of natural science. Students graduating from Texas Tech University should be able to explain some of the major concepts in the natural sciences and demonstrate an understanding of scientific approaches to problem solving, including ethics. This course satisfies the Core Curriculum (graduation requirement) in Natural Sciences.

Coordinating Board / Student Learning / College Level Objectives
I. Coordinating Board Objectives:

Learning Objective 1: Critical Thinking – analyzing, evaluating and synthesizing information

Expected learning outcomes & methods of assessment:
Upon completion of this course, students should be able to:
1. apply their understanding of solar and terrestrial radiation to identify and evaluate factors influencing the energy balance of the earth/atmosphere system, including the atmospheric greenhouse effect. Questions related to varying solar

angles and the role of greenhouse gases and clouds in controlling temperature will be included on a pre- and post-course knowledge survey and/or in-class exams. The number of students correctly answering the questions will allow a quantitative measure of the percent improvement from the initial pre-course survey.

2. apply their understanding of the forces of motion to explain the flow of air in the atmosphere on various space and time scales. Questions related to individual forces that operate in the atmosphere and the balance of those forces at both the surface and upper atmosphere will be included on a pre- and post-course knowledge survey and/or in-class exams. The number of students correctly answering the questions will allow a quantitative measure of the percent improvement from the initial pre-course survey.

3. apply their understanding of adiabatic processes and atmospheric stability to explain processes related to cloud formation. Questions related to how adiabatic processes lead to saturation and how determining the stability of the atmosphere relates to the type of cloud that forms will be included on a pre- and post-course knowledge survey and/or in-class exams. The number of students correctly answering the questions will allow a quantitative measure of the percent improvement from the initial pre-course survey.

Learning Objective 2: Empirical and Quantitative skills – manipulation and analysis of numerical or observable data resulting in informed conclusions.

Expected learning outcomes & methods of assessment:

Upon completion of this course, students should be able to:

1. use surface observations to evaluate numerical parameters related to atmospheric moisture. Questions related to specific quantitative measures of humidity in the atmosphere will be included on a pre- and post-course knowledge survey and/or in-class exams. The number of students correctly answering the questions will allow a quantitative measure of the percent improvement from the initial pre-course survey.

2. use analyzed surface and upper air observations to identify horizontal pressure gradients and various pressure features such as cyclones and anticyclones. Questions regarding the interpretation of either surface or constant pressure maps will be included on a pre- and post-course knowledge survey and/or in-class exams. The number of students correctly answering the questions will allow a quantitative measure of the percent improvement from the initial pre-course survey.

II. TTU Student Learning Objectives:

Learning Objective 1: Demonstrate knowledge of the scientific method and contrast it

with other ways of understanding the world.

Expected learning outcomes & methods of assessment:

Upon completion of this course, students should be able to:

Identify the fundamental elements of the scientific method. The scientific method will be contrasted with other methods of understanding the atmosphere such as weather folklore or anecdotal observations. Questions regarding the scientific method will be included on a pre- and post-course knowledge survey and/or in-class exams. The number of students correctly answering the questions will allow a quantitative measure of the percent improvement from the initial pre-course survey.

Learning Objective 2: Demonstrate knowledge of the tools and methods used by scientists to study the natural world.

Expected learning outcomes & methods of assessment:

Upon completion of this course, students should be able to:

Identify and explain how Doppler radar and weather satellites are used by atmospheric scientists to observe and study the atmosphere. The use of numerical models in forecasting and research will also be presented. Questions designed to assess knowledge of how radar and satellites are used will be included on a pre- and post-course knowledge survey and/or in-class exams. The number of students correctly answering the questions will allow a quantitative measure of the percent improvement from the initial pre-course survey.

Learning Objective 3: Explain some of the major theories in the Natural Sciences.

Expected learning outcomes & methods of assessment:

Upon completion of this course, students should be able to:

Identify and explain various aspects of theories related to such topics as tornado-genesis and natural/anthropogenic climate change. Specific questions related to topics such as these will be included on a pre- and post-course knowledge survey and/or in-class exams. The number of students correctly answering the questions will allow a quantitative measure of the percent improvement from the initial pre-course survey.

Learning Objective 4: Describe how Natural Sciences research informs societal issues, including ethics.

Expected learning outcomes & methods of assessment:

Upon completion of this course, students should be able to:

Identify certain topics in atmospheric science such as climate change and severe/ hazardous weather phenomena that can impact society and discuss how they may impact decision-making and policy development. The importance of ethics in

atmospheric research will also be discussed. Specific questions will be included on a pre- and post-course knowledge survey and/or in-class exams. The number of students correctly answering the questions will allow a quantitative measure of the percent improvement from the initial pre-course survey.

III. College Level Competency Objective:

Learning Objective 1: Students graduating from Texas Tech University should be able to explain some of the major concepts in the Natural Sciences and to demonstrate an understanding of scientific approaches to problem solving, including ethics.

Expected learning outcomes & methods of assessment:

Upon completion of this course, students should be able to:

Discuss and critically evaluate viewpoints on atmospheric science topics. Students will also understand the proper role of hypothesis testing and experimental design in conducting research on atmospheric phenomena, and the value of scientific integrity. Specific questions will be included on a pre- and post-course knowledge survey and/or in-class exams. The number of students correctly answering the questions will allow a quantitative measure of the percent improvement from the initial pre-course survey.

Exams

There will be three (3) in-class exams during the semester. Questions on the exams will be based on lectures, textbook material and other material given in class (e.g., worksheets). The in-class exams will consist of a combination of multiple choice, true/false, fill-in-the-blank, and short-answer type questions. **Students must bring an orange scantron sheet and a #2 pencil to class on exam days.** If you arrive late to any exam, you must complete the exam by the end of the class time. The three in-class exams will not be cumulative in that there will be no specific questions from previous exam material. However, you may need to apply previously learned material on certain questions. You will have 7 calendar days following the day grades are posted on blackboard to raise any questions regarding your grade on that exam. After the 7-day period the exam grade will not be changed. There is no traditional final exam.

Extra Credit

An extra credit project will be available toward the end of the semester, which will be worth up to 30 points (10% of the final grade in the class). The extra-credit project is NOT mandatory. Students will not receive full points on the assignment if instructions are not followed. Full points on the assignment will be equivalent to a letter grade increase for the student's final grade.

Method of Determining the Final Course Grade

The final course grade will be computed by averaging the three exam grades (each worth a possible 100 points). If you complete the extra credit project, you will receive a

percentage of that grade added to your final grade from the exams (see Extra Credit section above). The final letter grade will be based on the following scale:

A= 89.5 or above
B = 79.5 - 89.4
C = 69.5 - 79.4
D= 59.5 - 69.4
F = below 59.5

No exam grade will be dropped. In order to be objective and fair to every student, the final letter grade will be based only on the above grading scale. *Individual requests for additional extra credit or additional points for whatever reason cannot be honored*.

Makeup Exams

Students who must be absent on exam day due to an approved university function or religious observance must schedule a time with the instructor to take a make-up exam. ***Absence on exam day due to illness or other reasons must be discussed with the instructor within one (1) day following the scheduled exam date.*** Make-up exams must be taken within 3 days (not counting weekends) following the scheduled exam date unless prior arrangements are made. It is the student's responsibility to contact the instructor (aaron.hill@ttu.edu) if an exam is missed. *Make-up exams may not necessarily be the same exam as given during the regularly scheduled exam period*.

Class Attendance

Class attendance is highly encouraged but no method of taking attendance is used. Therefore, attendance will not be a factor in determining the final course grade. If you must miss a class, it is your responsibility to obtain lecture notes from a reliable neighbor. Occasionally, handouts will be given in class to assist in learning material but the material will not be graded. Powerpoint slides of lectures and any other materials distributed in class will be available via the class website.

A student is excused from attending classes or other required activities, including examinations, to observe a religious holy day and for time needed for travel for the purpose of observance of a religious holy day and is not required to give advance notice of such absence.

Students with Disabilities

Any student who, because of a disability, may require special arrangements in order to meet the course requirements should contact the instructor as soon as possible to make any necessary arrangements. Students should present appropriate verification from Student Disability Services during the instructor's office hours or by appointment. Instructors are not allowed to provide classroom accommodations to a student until appropriate verification from Student Disability Services has been provided. For additional information, contact the Student Disability Services office at 335 West Hall or 806-742-2405.

Academic Integrity

Cheating in any form will NOT be tolerated! Refer to the Code of Student Conduct in the Student Handbook
http://www.depts.ttu.edu/dos/docs/entire_student_handbook.pdf

Civility in the Classroom
Students are expected to conduct themselves in a courteous and respectful manner during class. The classroom is a learning environment so talking to others should be kept to a minimum. Please turn off or silence your cell phone while in the classroom.

Other Items

a. The topics listed by date on the class schedule are subject to change. The exam dates will not change. Any changes to the material covered on an exam will be announced in class.
b. If you are also taking the laboratory course (ATMO 1100), your lab grade does not factor into your grade in this course.
c. Grades will be posted on Blackboard as soon as possible following an exam. All other information pertaining to the class will be posted on the class website.
d. A grade of "I" for Incomplete will be given only if all of the following criteria are met: You have a valid extenuating circumstance, you provide proof of this circumstance from the Center for Campus Life and your course grade is a "D" or higher at the effective time of the circumstance.
e. No prior knowledge of atmospheric science is assumed for this class.
f. Students having difficulty with any of the material presented in class are **strongly** encouraged to meet with the instructor during office hours. Questions submitted via email are always welcome and will be answered promptly.

#	Date	Day	Chapter	Topic
1	11–Jul	Tue	1	Administrative materials, Introduction to the Atmosphere
2	12–Jul	Wed	2	The Energy Cycle
3	13–Jul	Thurs	2,3	The Energy Cycle and Temperature
4	14–Jul	Fri	3,6	Temperature and Atmospheric Forces and Wind
5	17–Jul	Mon	6,4	Atmospheric Forces and Wind and Water in the Atmosphere
6	18–Jul	Tue	4	Water in the Atmosphere, Review for Exam 1
7	19–Jul	Wed	*Exam 1*	*Exam 1*
8	20–Jul	Thurs	1,5	Observing the Atmosphere
9	21–Jul	Fri	7,12	Global/Small Scale Winds
10	24–Jul	Mon	9	Air Masses and Fronts
11	25–Jul	Tue	10	Extratropical Cyclones and Anticyclones
12	26–Jul	Wed	8	El Nino and Hurricanes
13	27–Jul	Thurs	8	El Nino and Hurricanes, Review for Exam 2
14	28–Jul	Fri	*Exam 2*	*Exam 2*
15	31–Jul	Mon	11	Thunderstorms and Tornadoes
16	1–Aug	Tue	11	Thunderstorms and Tornadoes
17	2–Aug	Wed	11	Thunderstorms and Tornadoes
18	3–Aug	Thurs	13	Weather and Forecasting
19	4–Aug	Fri	13	Weather and Forecasting
20	7–Aug	Mon	14,15,16	Climate and Climate Forecasting, Other Topics
21	8–Aug	Tue	-	Review for Exam 3 / Surveys
22	9–Aug	Wed	*Exam 3*	*Exam 3*