

GEOGRAPHY 131: Weather and Climate
SYLLABUS FOR FALL SEMESTER 2007

Course Number: Geography 131-02 (CID 4753): 3 credit hours

Time and Place: MWF 11:00-11:50 AM LDB 215

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Course Description: The basic concepts of meteorology and climatology are introduced. Atmospheric temperature and pressure, winds, moisture, and air masses and storms are systematically covered, followed by an overview of the major climates and ecosystems of the earth. Environmental problems are considered where pertinent.

Rationale: The purpose of this course is to provide students with a basic understanding of the atmospheric variables and processes responsible for weather and climate. As such, it will enable students to better understand and appreciate the potential significance of global climate change. This course is relevant for anyone who has an interest in weather and climate, who wishes to teach earth science courses, or whose research is better served through a better understanding of weather and climate on earth.

Objectives: Upon completion of this course, the student should:

- gain a better understanding of the composition and structure of the atmosphere;
- acquire factual knowledge about electromagnetic radiation and temperature laws and learn how they relate to the global energy balance;
- learn the fundamental principles of and the relationships between temperature, pressure, density, and air circulation;
- understand the fundamental concepts of relative humidity, lapse rates, cloud formation and precipitation;
- develop an understanding of fronts and severe weather phenomena;
- learn about geographical trends in temperature, pressure, wind, and moisture regimes;
- understand the theory behind the Köppen climate classification system; and,
- be able to discern the facts regarding the causes and consequences of global climate change.

Methods of Instruction: The course will be delivered by means of PowerPoint presentations and video when appropriate. Lectures will be scheduled to coincide as closely as possible to

activities that are undertaken in lab. The lab, GEO 111, must be taken concurrently with this course. Homework assignments will be given throughout the semester.

Textbook: eWeather and Climate. Gillespie B.M., Netoff, D. I. and Tiller, J. W., 2006. Sam Houston State University, Huntsville, TX.

Supplies: Scantron test forms (100-question version 882ES)

Supplementary Readings: Distributed in class or posted on Blackboard.

Grading Criteria: Grading will be based on three lecture exams and three homework assignments. Each exam will comprise 100 points and each homework assignment will comprise 60 points (480 points total). *In a course such as this, each topic serves as the foundation for subsequent material; consequently, students must remember and understand all of the basic principles covered previously in the course in order to do well on each successive exam.* So, in that sense, each exam, including the Final, is "comprehensive."

Exams: Exams will be multiple-choice format, ranging from 50 to 75 questions. Although multiple-choice in nature, you will be expected to perform a limited amount of very basic arithmetic. Exams will consist of a combination of true/false questions, standard multiple choice questions, matching exercises, and math problems. Each exam will be worth 100 points.

Homework assignments: Each homework assignment will be worth 60 points. Assignments will consist of the same types of problems as described for exams. Homework assignments will be completed using scantron forms. Homework assignments are worth a total of 180 points and constitute 36% of the course grade.

DO NOT EXPECT 'CURVES' ON EXAMS.

YOU MUST PASS AT LEAST ONE EXAM IN ORDER TO PASS THE COURSE, NO MATTER HOW MANY TOTAL POINTS YOU'VE EARNED. Please note that I do not drop any scores. All scores are used to calculate your final grade.

Grade Determination: Your grade at any point in the semester is based on the percentage of total possible points earned. So, to determine your grade at any time, add the total number of points earned to date, then divide this value by the total number of points that the completed assignments and exams are worth. Multiply this value by 100 to get your overall percentage.

Point Range for Each Letter Grade:

A	= 450-500
B	= 400-449
C	= 350-399
D	= 300-349
F	< 299

If, at the end of the semester, you are within 1% point of the next higher grade, I will consider raising your grade if:

- a) You did not have more than 1 absence
- b) You came to class on time and paid attention in class (*I'll know who those students are*)
- c) You made at least one exam grade equal to the desired final grade and/or you showed significant improvement

Use the following form to calculate your grade. Do not lose this - it is your check against the final grade that I give you! To use this chart, first record the score you earned in the "Score column". Then, add the points in this column together and place the value adjacent to your last grade in the "Total Points Earned to Date" column. Finally, divide the cumulative "Total Points Earned to Date" value by the number to the right and multiply by 100 to determine your percentage. *For example, if you made a 50 on Homework 1 and 80 on Exam I, your point total would be 130. Divide 130 by 160 and multiply by 100 to obtain 81.3%.*

$$* \text{Percentage} = (\text{Cum. Points Earned} / \text{Cumulative Points Possible}) \times 100$$

Assignment or Exam	Score (Points Earned)	Cum. Points Earned to Date	Cumulative Points Possible	Percentage Score
Homework 1			60	
Exam I			160	
Homework 2			220	
Exam II			320	
Homework 3			380	
Final Exam			480	
Attendance			500	

The number of points that must be earned on the Final Exam to obtain the grade you desire can be derived using the following equation:

$$\text{No. of Points needed on Final} = (500 \times \text{desired grade percentage}) - \text{Total points earned to date.}$$

Ex: If you earned 350 points prior to taking the Final Exam, and desire a B (80% or 0.8) in the course, the number of points you need on the Final to obtain a B in the course is 50:

$$\begin{aligned} (500 \times 0.8) - 350 &= X \\ 400 - 350 &= 50 \end{aligned}$$

Attendance and Make-up Policies: This course abides by University Policy and Regulations concerning attendance. (see Undergraduate Catalog.) Accordingly, "Regular and punctual attendance is expected for each student at Sam Houston State University." To encourage attendance, I give each student 20 points at the beginning of the semester. After one "free" absence, I will deduct 5 points for each subsequent, *unexcused* absence - up to a maximum of 20 points. In order for an absence to be excused, **some form of documentation MUST be provided.** Although 20 points does not sound like much, it amounts to 4% of the course grade!

For those students that are borderline to the next highest grade, the extra 4% for attendance can make a big difference. So, please come to class!

1. In addition to the required attendance policy, it is necessary that you please come to class *on time*. Tardy students disrupt the class and adversely affect the presentation of information, as well as other activities. **Each tardy after the first will be subject to 2 points being deducted from your total grade. If you leave early without prior consent of the instructor, you will be subject to an absence.**
2. No make-ups for exercises. If you know *beforehand* that you will not be able to hand in an assignment personally, then please notify me. Do not submit your assignments by proxy! I will arrange a date, time and location for you to submit it to me – again, that is only as long as you’ve notified me in advance of the class meeting in which the assignment is due. If you know *beforehand* that you will be unable to take an exam on the day it is scheduled, you must take the exam *ahead* of schedule.

Study Tips:

1. **Always come to class.** You will not do well in the course if you skip class--this is virtually guaranteed.
2. **Take good notes:** Although the course lecture material is on PowerPoint, you should highlight key words and concepts and add additional information as needed to help you master the material.
3. For those students who want to do well in college, **reading their textbooks is recommended.** So, **read the chapters** in the book at the time they are being covered in lecture and highlight the key concepts. Highlighting as you read helps you to stay focused on the material and helps you to actively process the information. In addition, it requires you to read the key points twice, and it also enables you to easily review for exams because you can simply reread the highlighted material rather than an entire chapter.
4. **Review the notes** from the previous lecture multiple times (i.e., at least once a week). This should greatly enhance your understanding of the material because it enables you to see the continuity and structure of the material. You also learn the material in small amounts, which is much easier to do than trying to learn it all at once just before the exam.
5. When it comes time to **review for an exam**, first read the highlighted portions of the text, then concentrate on your notes. You might also want to follow the procedures below:
 - a. The first time you review your notes, concentrate on absorbing the key ideas and understanding the organization of the material - why certain ideas followed others in the class and how they are related.
 - b. Once this is done, review the material again to learn the details - the “whys.” Bear in mind that **exams in this course are NOT based on the mere memorization of definitions or on the recognition of verbatim statements from lecture.** Rather, the exam questions assume you already know the definitions and that you understand the concepts discussed

in lecture. So, as a rule you will not be asked definitions; rather, you will be asked to **apply** them, (i.e., to form mental constructs of concepts that are built upon definitions and other fundamentals). Again, you cannot simply memorize your notes and expect to do well on the exams. You must truly understand the **meaning** of the notes in order to obtain a good grade...

- c) **Pretend that you are teaching the material to someone else.** If you can deliver (from memory) a lecture of the study material in an organized, comprehensive manner, then you understand it. If you cannot, then you need to review some more. **THIS IS THE MOST IMPORTANT STUDY TECHNIQUE FOR ANY CLASS.**

Academic Honesty:

All students are expected to engage in all academic pursuits in a manner that is above reproach. Students are expected to maintain complete honesty and integrity in the academic experiences both in and out of the classroom. Any student found guilty of dishonesty in any phase of academic work will be subject to disciplinary action. The University and its official representatives may initiate disciplinary proceedings against a student accused of any form of academic dishonesty including, but not limited to, cheating on an examination or other academic work which is to be submitted, plagiarism, collusion and the abuse of resource materials.

Students are encouraged to study in groups to prepare for exams. However, “group effort” is definitely not permitted when taking exams! This will result in an automatic zero on a test and possible action at the departmental level.

Proper Course Behavior:

As stated above, students should:

- 1) Refrain from behavior in the classroom that intentionally or unintentionally disrupts the learning process and, thus, impedes the mission of the university. Cellular telephones and pagers must be turned off before class begins. Students are prohibited from eating or drinking in class, using tobacco products, making offensive remarks, reading newspapers, sleeping, talking at inappropriate times, wearing inappropriate clothing, or engaging in any other form of distraction. Inappropriate behavior in the classroom shall result in a directive to leave class. Students who are especially disruptive also may be reported to the Dean of Students for disciplinary action in accordance with university policy.
- 2) Please come to class on time - there is no reason to be late to class on a frequent or consistent basis. **Habitual tardiness is unacceptable.**
- 3) **Please remain in class until it finished. It is extremely rude to get up and walk out of a class before a professor has indicated that the class is over. I reserve the right to count absent anyone who leaves early for no apparent reason unless that person has notified me ahead of time or there is an emergency.** I’m normally okay with leaving early as long as I have some notice ahead of time or at the beginning of class.

- 4) **You may not leave the class during an exam** – for obvious reasons (unless there is a medical emergency). Recommendations: If you think that you will need a Kleenex during the test, then bring a box with you to class. If you were late getting to class and think you may need a restroom break during the exam, please indicate this to me and I will allow you to go prior to issuing the exam.
- 5) Hats must be removed and put away during exams.
- 6) During exams, cell phones and any other equipment capable of receiving, recording and/or transmitting information, must be put away in a book bag or purse.
- 7) **If you miss an exam (without a documented, acceptable excuse), any make-up provision will come at the discretion of the instructor, and is not hereby guaranteed.** If such a provision is made, the exam may be a different version from that given to the rest of the class.

VISITORS IN THE CLASSROOM: *Unannounced visitors to class must present a current, official SHSU identification card to be permitted in the classroom. They must not present a disruption to the class by their attendance. If the visitor is not a registered student, it is at the instructor's discretion whether or not the visitor will be allowed to remain in the classroom.* This policy is not intended to discourage the occasional visiting of classes by responsible persons. Obviously, however, the visiting of a particular class should be occasional and not regular, and it should in no way constitute interference with registered members of the class or the educational process.

Americans with Disabilities Act: *SHSU adheres to all applicable federal, state, and local laws, regulations, and guidelines with respect to providing reasonable accommodations for students with disabilities. If you have a disability that may affect adversely your work in this class, then I encourage you to register with the SHSU Counseling Center and talk with me about how I can best help you. All disclosures of disabilities will be kept strictly confidential. Note: No accommodation can be made until you register with the Counseling Center.* Therefore, any student seeking accommodations should go to the *Counseling Center and Services for Students with Disabilities* in a timely manner and complete a form that will grant permission to receive special accommodations.

Religious Holy Days: If a student desires to be excused from class, assignment, or an exam to participate in activities associated with a religious holy day, then the student must notify the instructor of each scheduled class that he/she will miss for religious reasons. In such cases, the student will be required to take the exam or submit the assignment early - unless there are good reasons for not being able to do so and the instructor has agreed to those reasons.

Special Circumstances: If unusual circumstances arise during the semester, such as a medical problem, death in the family, etc., that adversely affects your attendance **PLEASE discuss this with me immediately and provide documentation.** Under these conditions, I will gladly do my best to accommodate your situation by excusing absences, allowing late work to be turned in within a reasonable time period, and so on. However, if you wait until after-the-fact, at the end

of the semester, to let me know that you were experiencing these adverse circumstances, there is *nothing* I can do about it at that time. **I will not retroactively make accommodations and I never give extra credit assignments to make up for grade deficiencies of any type.**

COURSE CONTENT

* This schedule is subject to change at any time based on class progress.

WEEK 1

Overview (Pages 1-40 of eWeather)

- Introduction to Course
- Concepts of Weather and Climate
- Science and Earth Systems
- Maps
- Earth's Atmosphere

WEEK 2

Air Temperature (Pages 46-86 of eWeather)

- Solar Radiation - nature, properties, fate
- Factors Controlling Radiation
- Insolation - earth-sun relationships
- Global Energy Budget

NO CLASS: LABOR DAY HOLIDAY – Monday, September 3, 2007

HOMEWORK #1 (Due at beginning of class on Monday or Wednesday of Week 3)

WEEK 3

Air Temperature (Pages 87-107 of eWeather)

- Heating and Heat-transfer Processes
- Temperature Scales
- Temperature vs. Heat – Kinetic Energy (Pages 115-116 of eWeather)
- Vertical, Horizontal and Temporal Variations

WEEK 4

Air pressure and Winds (Pages 108-131 of eWeather)

- Causes of Atmospheric Pressure and Importance
- Measurement and Forms of Expression
- Vertical Variations in Pressure
- Horizontal Variations - Mechanical and Thermal Origins
- Wind Direction and Speed

WEEK 5

Air pressure and Winds (Pages 132-159 of eWeather)

- High and Low Pressure Cells (anticyclones and cyclones)
- Global Pressure and Wind Systems
- Local Wind Systems
- Upper Level Winds and Jetstreams

EXAM #1 (approx. at end of 5th week of classes)

WEEK 6

Moisture in the Atmosphere (Pages 160-183 of eWeather)

- Properties of Water
- Phase Change and Concept of Latent Heat
- Humidity
- Cooling processes - radiation, conduction, mixing

WEEK 7

Moisture in the Atmosphere (Pages 183-193 of eWeather)

- Uplift: Stability vs. Instability of Airmasses
- Adiabatics (see also pages 114-115 in eWeather)
- Uplift Mechanisms - convection, convergence, orographic, frontal

HOMEWORK #2 (Due at beginning of class)

WEEK 8

Moisture in the Atmosphere (Pages 193-235 of eWeather)

- Condensation and Precipitation
- Forms - dew, fog, clouds, frost
- Types of Clouds
- Precipitation Processes
- Forms of Precipitation
- Global Patterns of Precipitation

WEEK 9

Airmasses and Storms (Pages 236-258 of eWeather)

- Airmass Source Regions and Characteristics
- Airmass Classification
- Modifications of Airmasses
- North American Airmasses

WEEK 10-11

Airmasses and Storms (Pages 259-330 of eWeather)

- Fronts and Frontal Cyclones - origin, development, types
- Severe Weather/Violent Storms - thunderstorms, tornadoes, hurricanes

EXAM #2 (approx. at end of 10th week of classes)

WEEK 12**Global Patterns of Climate** (Pages 331-405 of eWeather)

Climate Classification System - Köppen

Climatic Types (See also Appendix A)

Video

WEEK 13**Global Patterns of Climate** (Pages 331-405 of eWeather)

Climate - Vegetation - Soil Relationships

HOMEWORK #3 (Due date pending)**WEEK 14: THANKSGIVING HOLIDAYS – Wednesday – Friday, November 21 – 23, 2007****WEEK 15 (Coverage of this material depends on class progress)****Climatic Change** (Pages 406-435 of eWeather)

Climatic Change - the evidence, possible causes (theories)

Anthropogenic Climate Change (see Pages 421-424 in eWeather)

Climate Modeling (see Page 424 in eWeather)

System Feedback (see Page 425 of eWeather)

FINAL EXAM (Wednesday, December 12, 11:00 AM to 1:00 PM)