Geography 1401, All Online
Sections Weather and Climate Lab
(Online) Credit Hours 0

1. **Course Description.** This is the lab course that is a companion to the four hour Geography 1401, Weather and Climate course. A course description for the three hour course follows: "A systematic introduction to weather and climate as it pertains to man. Topics discussed will include components of weather, weather processes and their measurement, climatic elements and control factors, and climate as a factor of physical environments." This is a 1 credit course. No prerequisites.

2. Class Meeting Times: Online, there are NO class meeting times scheduled.

3. Method of Instruction: Online

4. Class Instructor: James W. Tiller, Jr.

5. Office Information

Office Location: LDB 332D Office Hours: 7:00-8:00AM, 9:30-11:00AM, Tuesday and Thursday, 7:00-9:00AM, Wednesday Office Phone: 936-294-1455 Office Email: geo_jwt@shsu.edu

6. Course Objectives

Maps To understand the basic elements and construction of the Geographic Grid System. To understand the importance of special meridians, parallels and points, such as the Prime Meridian, Equator, North Pole, South Pole, Tropic of Cancer, Tropic of Capricorn, Arctic Circle and Antarctic Circle. To be able to use the Geographic Grid System to locate points or features on globes and maps. To understand the various methods of expressing map scale and to be able to convert from one scale to another. To understand directional references on a map or globe, such as north, south, southwest, etc.

Earth-Sun Relationships To understand the geometric relationships between the earth and the sun as they pertain to daily and seasonal variations in insolation. To be able to calculate the angle of the noonday sun for an observer at any latitude on any specific day of the year. To be able to graphically illustrate how proper architectural design can improve the energy efficiency of a home.

Temperature To be able to understand the differential heating and cooling characteristics of land vs. water and the reasons for them. To be able to understand the "greenhouse effect" and identify the major tropospheric gasses that are involved. To be able to understand the effect of variations in specific heat on the differential heating and cooling of various substances. To be able to convert Celsius to Fahrenheit and vice versa. To be able to construct an isotherm map from temperature data. To be able to explain the general global patterns of isotherms and how they are affected by land and water distribution, latitude, ocean currents and seasonal changes. To be able to measure the albedo of different surfaces and relate variations to the actual surface of the earth.

Weather Observation and Weather Instruments To understand how to use basic meteorological instruments including the mercurial thermometer, sling psychrometer, anemometer and aneroid barometer. To be able to measure temperature, wind speed, relative humidity, dew point and atmospheric pressure at selected campus locations. To be able to observe and record selected weather conditions such as cloud cover, cloud type(s) and current weather observed.

Pressure and Winds To be able to understand the causes of horizontal pressure variations. To be able to convert from inches of mercury to millibars and vice versa. To predict surface wind direction and relative wind velocity with known pressure gradient force, Coriolis effect and frictional drag. To be able to construct and interpret isobaric maps. To relate surface areas of convergent and divergent flow to vertical circulation. To understand a generalized model of planetary pressure and wind systems and how they change seasonally. To be able to graphically illustrate selected local wind systems.

Atmospheric Moisture To understand the relationship of relative humidity to air temperature, capacity, mixing ratio and dew point. To understand the conditions in the atmosphere that can result

in condensation and precipitation. To be able to differentiate between the various forms of condensation and precipitation. To be able to determine the Heat Stress Index at various temperatures and relative humidities.
Adiabatic Processes and Atmospheric Stability To understand the principles of adiabatic cooling and heating in the atmosphere. To be able to identify and explain the major mechanisms (orographic, convectional and frontal-cyclonic) that lead to large-scale uplift and cause extensive cloudiness and precipitation. To be able to calculate the adiabatic temperature changes of rising and subsiding parcels of air and determine the humidity characteristics of such air parcels at selected elevations. To determine and be able to graphically illustrate conditions of stability, instability and conditional instability under different environmental lapse rate conditions. To be able to develop hypotheses regarding the type and intensity of clouds that are likely to develop under stable, unstable, cyclonic and anticyclonic atmospheric conditions. To be able to propose hypotheses to account for the "rainshadow effect."
Air Masses and Air Mass Weather To understand the concept of air masses and air mass weather. To know the principal North American air masses and their characteristics. To be able to characterize and classify air masses from data presented on synoptic weather maps. To be able to understand the concept of air mass modification - how such modifications affect atmospheric stability and how to recognize modified air masses on a weather map. To further develop skills in outdoor weather observation and analysis. To develop hypotheses to account for selected weather situations utilizing the air mass model, and to provide supportive observational evidence to support these hypotheses.
Weather Map Construction and Analysis To be able to decode and analyze weather maps. To be able to construct surface fronts and isobars from meteorological data represented by standard weather station models. To understand the dynamics and trajectories of typical mid-latitude cyclonic and anticyclonic systems. To be able to relate the characteristics and dynamics of mid-latitude weather systems to specific weather occurrences. To be able to utilize the information and concepts in the objectives above to predict weather changes associated with the passage of cyclonic and anticyclonic systems. To be able to formulate hypotheses to account for specific weather phenomena at selected localities and times on a United States weather map.
Violent Storms To be able to understand the formation and life history of violent storms - thunderstorms, tornadoes and hurricanes. To be able to describe the anatomy of each of the violent storm types. To be able to develop hypotheses to account for the spatial and temporal variations in the occurrence of violent storms. To be able to identify specific atmospheric and hydrological hazards associated with violent storms.
Global Climates To become familiar with the modified Koeppen system of climate classification. To be able to develop hypotheses to explain the major climatic characteristics of various climates using the "climatic controls" approach. To be able to construct a climogram from monthly temperature and precipitation data and analyze the data in terms of probable location. To learn to associate certain climatic types with specific vegetation communities and soil types. To gain an appreciation of the impact of climate on human use of the earth.
7. Class Materials Required
Lab Manual: Netoff, Dennis I. **Weather and Climate**. START Group, most recent edition.
Book: While there is no textbook for this class, a CD entitled ***eWeather & Climate*** by Gillespie, Netoff and Tiller, is included with the Lab Manual for this class.
8. Course Outline:
Lab 1: Maps
A. Introduction B. Grids C. Scale and Distance D. Direction
Lab 2: Earth-Sun Relationships
A. Causes of the Seasons B. Sun Angle C. Special Topic: Solar Design
Lab 3: Temperature

A. The Greenhouse Effect B. Vertical Temperature Profile C. Horizontal Temperature Patterns D. Temperature and Time E. Temperature Conversions F. Specific Heat and Albedo G. Specific Heat Experiment H. Albedo Experiment
Lab 4: Weather Observation and Weather Instruments
A. Weather Observations B. Weather Station Model C. Clouds
Lab 5: Pressure and Winds Air Pressure B. Vertical Variations C. Horizontal Variations D. Wind E. Cyclones and AntiCyclones F. Global Pressure and Wind Systems G. Local Winds H. Convection Cell Experiment I. Conversions J. Isobaric Maps K. The Continent of Frigidia
The Mid-Term Exam
Lab 6: Atmospheric Moisture
A. The Uniqueness of Water B. Relative Humidity C. Forms of Condensation and Precipitation D. Condensation Chamber Demonstration E. Special Topic: Human Comfort
Lab 7: Adiabatic Processes and Atmospheric Stability
A. Convection Uplift and Associated Clouds B. Frontal-Cyclonic Activity C. Orographic Precipitation and the Rainshadow Effect D. Special Topic: Inversions and Atmospheric Pollution
Lab 8: Air Masses and Air Mass Weather
A. Air Mass Source Regions B. North American Air Mass Source Regions
Lab 9: Weather Map Construction and Analysis
A. Decoding a Station Model B. Locating Fronts
Lab 10: Violent Storms
A. Thunderstorms B. Severe Thunderstorms C. Tornadoes D. Hurricanes E. Cyclone Demonstration
Lab 11: Global Climates
A. Global Climate Classification Systems B. Classifying Climates
The Final Exam
9. Course Requirements
Exams. The organizing basis of this course will be the 11 Lab lessons as presented in your Lab Manual. The material upon which you will be examined will be taken from **BOTH** the reading material in your Lab Manual as well as the answers and related feedback provided for each of the questions in your Lab Manual on this site. The Related Reading is solely provided to assist you if you feel you need additional information on a topic beyond what is offered in the Lab Manual and the Lab Activities section on this site. Your grade for this course will be based on your performance on eleven Lab Quizzes, a Mid-Term Exam and a Final Exam.
Lab Quizzes: Multiple-Choice/True-False; 30 percent of your final course grade *Mid-Term Exam*: Multiple-Choice/True-False; 35 percent of your final course grade *Final Exam*: Multiple-Choice/True-False; 35 percent of your final course grade
Grading Curves. No grading "curves," either upward or downward, should be expected.
Extra Credit. There are NO extra credit opportunities in this course.
Unable to Complete the Course. If you are not able to complete the course requirements, you have several options:
(1) you should expect to receive a grade of "F" for the course unless one of the options below is available to you (2) you drop the course by the date required. See the University Catalog for specifics. (3) you resign from the University by the date required. See the University Catalog for specifics. (4) you receive a grade of "X" for the course. See the University Catalog for specifics.
Re-Grading Privileges. There is no re-grading privilege. This is not elementary or high school. You have one shot to make a grade on a quiz/exam. If you take the exam, you will receive the grade you make. If you are not prepared to take the exam -- DO NOT TAKE THE EXAM.
Posting of Grades. Grades will be submitted to the University for posting on your unofficial transcript.

10. Letter Grade Scale. Your final course grade will be based on the class Exams as described above.
A - Final Class Average of 90 to 100
B - Final Class Average of 80 to 89.99
C - Final Class Average of 70 to 79.99
D - Final Class Average of 60 to 69.99
F - Final Class Average of 59.99 or less
11. 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 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 academic dishonesty including, but not limited to, cheating on examinations or other academic work which is to be submitted, plagiarism, collusion and the abuse of resource materials.
Cheating includes:
Copying from another student's test paper, laboratory report, other report, or computer files, data listings, and/or programs.
Using, during a test, materials not authorized by the person giving the test.
Collaborating, without authorization, with another student during an examination or in preparing academic work.
Knowingly, and without authorization, using, buying, selling, stealing, transporting, soliciting, copying, or possessing, in whole or in part, the contents of an administered test.
Substituting for another student, or permitting another student to substitute for oneself, to take a test.
Bribing another person to obtain an administered test or information about an administered test.
Purchasing, or otherwise acquiring and submitting as one's own work any research paper or other writing assignment prepared by an individual or firm. This section does not apply to the typing of the rough and/or final versions of an assignment by a professional typist.
Plagiarism means the appropriation of another's work or idea and the unacknowledged incorporation of that work or idea into one's own work offered for credit.
Collusion means the unauthorized collaboration with another person in preparing work offered for credit.
Abuse of resource materials means the mutilation, destruction, concealment, theft or alteration of materials provided to assist students in the mastery of course materials.
In a word or two: If I catch you engaged in any form of academic dishonesty, I will pursue the matter to the bloody end and do all in my power to not only remove you from the class, and give you the grade of "F" that you so richly deserve. I will also do all that I can to have you removed from the University.
12. Religious Holy Days. Students that are absent from class for the observance of a religious holy day are allowed to take an examination or complete an assignment scheduled for that day within reasonable time after the absence. The period of time during which assignments and exams will be excused includes travel time associated with the observance of the religious holy day. A student who wishes to be excused for a religious holy day must present the instructor of each scheduled class that he/she will be absent from class for religious reasons with a written statement concerning the holy day(s) and the travel involved. The instructor should provide the student with a written description of the deadline for the completion of missed exams or assignments. In such cases, the student will be required to take the test 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.
13. Americans with Disabilities Act. It is the policy of Sam Houston State University that no otherwise qualified disabled individual shall, solely by reason of his/her handicap, be excluded from the participation in, be denied the benefits of, or be subjected to discrimination under any academic

or Student Life program or activity. Disabled students may request assistance with academically related problems stemming from individual disabilities by contacting the Director of the Counseling Center in the Lee Drain Annex or by calling (936) 294-1720. 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.

14. Letters of Recommendation. I only write letters of recommendation for students who make an "A" in the class.

15. Class Evaluations. You may be asked toward the end of the semester to complete a course/instructor evaluation.