GEOG 0001L - PHYSICAL GEOGRAPHY LABORATORY

Catalog Description

Prerequisite: Completion with grade of "C" or better or concurrent enrollment in GEOG 1
Hours: 54 laboratory
Description: Earth's physical systems, atmosphere, weather and climate, landforms and fluvial systems; includes map reading and investigating remote sensing, GPS, and Geographic Information Systems (GIS). (C-ID GEOG 111) (combined with GEOG 1, C-ID GEOG 115) (CSU, UC)

Course Student Learning Outcomes

- CSLO #1: Identify geographic grid systems on a topographic map.
- CSLO #2: Analyze Earth motions and Earth-Sun relations and seasonal variation.
- CSLO #3: Forecast basic weather conditions by applying gathered information such as barometric pressure, wind direction and speed, temperature, and cloud patterns.
- CSLO #4: Map world climate zones using the Koppen climate system.
- CSLO #5: Identify and describe landforms using stereoscopes (and other relevant technology). Create landform models using clay or other media.

Effective Term

Fall 2021

Course Type

Credit - Degree-applicable

Contact Hours

54

Outside of Class Hours

0

Total Student Learning Hours

54

Course Objectives

1. Identify geographic grid systems on maps.
2. Interpret topographic quadrangle and locate geographic features.
3. Analyze Earth's motions and Earth-Sun relations.
4. Calculate geographic position using the analemma.
5. Analyze elements of heat budget & equilibrium.
6. Measure barometric pressure.
7. Manipulate models to conceptualize high & low pressure dynamics.
8. Draw air pressure and wind maps (barometric pressure, isobars, pressure gradient, pressure centers or cells, etc.).
9. Draw localized wind patterns.
10. Integrate fundamentals of weather and climate with significance of air masses and fronts.
11. Diagram and calculate vertical temperature change using various lapse rates (normal, dry & wet adiabatic).
12. Solve problems involving interplay between water vapor capacity, humidity, dew point, condensation and precipitation.
13. Gather tabular climate data (on-line) then chart climographs to describe & analyze climate patterns.
14. Investigate major causes of these places (described above with climographs), such as latitude, proximity to oceans, wind & ocean currents, elevation, topographic barriers and pressure belts.
15. Interpret aerial photographs to discern landscape features, such as volcanic and tectonic landforms.
16. Discuss how stream and fluvial processes shape landforms.
17. Manipulate GPS units to map waypoints, use remote sensing on computers to investigate landforms and discern landscape features, and explore common uses of geographic information systems (GIS).

General Education Information

- Approved College Associate Degree GE Applicability
  - AS - Physical Science Lab
- CSU GE Applicability (Recommended-requires CSU approval)
  - CSUGE - B3 Lab Activity
- Cal-GETC Applicability (Recommended - Requires External Approval)
- IGETC Applicability (Recommended-requires CSU/UC approval)
  - IGETC - 5C Laboratory Science

Articulation Information

- CSU Transferable
- UC Transferable

Methods of Evaluation

- Essay Examinations
  - Example: Students are provided raw data of average temperatures at specific latitudes (locations); then they must explain the variation of temperature with latitude; and then explain the increase of temperature amplitude (extreme variations); e.g. as we move away further from the equator, students should notice the difference between the avg. temperatures in July versus January, which increases gradually with latitude. Students must explain the reasons (angle of noon sunshine and duration of day) for this variation.
- Objective Examinations
  - Example: Correctly define the period (range of dates) when the north pole receives a full 24 hour light, even if very low on the horizon. Hint: Another way of seeing this phenomenon, this unique place at the "top" of the world is in front of the circle of illumination what time of the year?
- Problem Solving Examinations
  - Example: Referencing both the dry and wet adiabatic lapse rates chart, student calculate the temperature of cooling as a parcel of air rises up a mountain from 1000 to 4000 feet above sea level - with clouds forming half way at 2,000 feet above sea level. This is a multi-part questions where they must calculate the dry rate 1st, then the wet rate.
- Skill Demonstrations
  - Example: After a brief lecture on how to set-up the GPS along with coordinate systems, student must demonstrate how to find a specific waypoint on campus using the GPS unit.

Repeatable

No

Methods of Instruction

- Laboratory
- Distance Learning

Lab:

1. After an instructor lecture on altitude, instructor organizes student groups and students will calculate one's latitude by using the altitude of the noon sun, an analemma chart, and a formula.
2. Instructor assists in reading graphing problems and then demonstrates how to solve them with specific examples. Example: Students will map the location of earthquakes in South America, then graph the depth (inland), then analyze the reason for occurrences and degree of magnitude.

Distance Learning

1. Instructor provides raw data. Examining climate data including average temperature & precipitation at a given location, students are able to accurately determine the Koppen climate zone designation. Instructor assists determining climate zone letters using climate charts (which are included in the lab manual).

Typical Out of Class Assignments

Reading Assignments

1. Read map exercises to locate latitude & longitude coordinates, UTM coordinates, locate Great Circle routes, correctly read and convert coordinate units to various units (e.g., degrees to miles) and be prepared to discuss in class. 2. Read and interpret U.S. Geologic Survey topographic (quadrangle) maps, including contours, grid systems and Township & Range, landmarks, symbols, and legend and be prepared to discuss in class. 3. Review lecture and textbook material on the nature of winds, such as what are the three (3) forces of the wind and be prepared to discuss in class.

Writing, Problem Solving or Performance

1. Use sling psychrometer to determine relative humidity with wet/dry bulb depression and the aid of air capacity chart. Calculate the absolute humidity and convert to appropriate units. Determine dew point temperatures and the effects of heating and cooling on relative humidity. Calculate and graph adiabatic cooling and heating. 2. Calculate location of place (latitude) using altitude of noon sun measurements, given formula and analemma (which indicates location of sun directly above earth at 90 degrees). Investigate paths of the sun as viewed from different latitudes on earth as well as from space. 3. Draw isobars on a map using interpolation methods base on station barometric readings. Apply to how fast and what direction winds will blow based on barometric pressure readings.

Other (Term projects, research papers, portfolios, etc.)

Required Materials

- Laboratory Manual - Physical Geography
  - Author: Darrel Hess
  - Publisher: Pearson
  - Publication Date: 2017
  - Text Edition: 12th
  - Classic Textbook?:
  - OER Link:
  - OER:

Other materials and-or supplies required of students that contribute to the cost of the course.

Protractor, calculator, ruler, colored pens, atlas