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Course Outline for GEOG 1L

INTRO TO PHYS GEOG LABORATORY

Effective: Fall 2005

I. CATALOG DESCRIPTION:
GEOG 1L — INTRO TO PHYS GEOG LABORATORY — 1.00 units

Application of the concepts, techniques, tools, and materials of physical geography. Practical exercises, experiments, observations, data analyses, and computer applications/simulations which augment understanding of geographic processes, interrelationships, spatial patterns and distributions. Use of maps, remotely-sensed imagery, and geographic information systems. Includes locational reference systems, time-space relationships, weather, climate, soils, vegetation, and landforms. Field trips/field projects may be included.

1.00 Units Lab

Prerequisite
GEOG 1 - Introduction to Physical Geography

Grading Methods:
Letter Grade

Discipline:

	MIN
Lab Hours:	54.00
Total Hours:	54.00

II. NUMBER OF TIMES COURSE MAY BE TAKEN FOR CREDIT: 1

III. PREREQUISITE AND/OR ADVISORY SKILLS:

Before entering the course a student should be able to:

A. GEOG1

IV. MEASURABLE OBJECTIVES:

Upon completion of this course, the student should be able to:

A. Apply the techniques, tools, and concepts of geography to the interpretation and analysis of spatial information, with emphasis on:
   1. The geographic grid and locational concepts,
   2. Space-time relationships,
   3. Maps,
   4. Geographic information systems and remote sensing technologies.
B. Apply knowledge of atmospheric processes, air/sea interactions, weather elements/events, and climate controls to the classification, properties, and distribution of world climate types.
C. Observe, describe, and explain the origins, characteristics, spatial distributions, interactions, and integrated patterns of climate, soils, vegetation, water resources, and land forms.
D. Recognize that all land forms are the result of the interaction of internal tectonic forces and external geomorphic processes.
E. Apply knowledge of these external and internal processes to an appreciation and understanding of the origins, characteristics, and spatial distributions of specific land forms.
F. Apply knowledge of resources, environmental hazards, and human-environmental interactions to rational decision-making processes and activities which affect the habitability of Planet Earth.

V. CONTENT:
A. Distance Concepts
   1. Length of a Degree on a Great Circle
   2. Proportional Relationship of a Globe to the Earth
   3. Verbal, Representative Fraction, Graphic Scales
B. Locational Reference Systems
   1. Geographic Grid and Coordinates
   2. Metes and Bounds
   3. Land Ordinance of 1785 (Township and Range)
   4. French Long Lot
   5. Land Grants
C. Longitude and Time Relationships
D. Maps
   1. Marginal Information, Systems, Legends

2. Relief Representation
3. Scale, Area, Detail Relationships
4. Measurements of Distance and Direction
5. Slope Measurements, Profiles
6. Projections and Their Properties
7. Thematic and Topographic Map Interpretation

E. Remotely-Sensed Imagery (Satellite, Photographic)
1. Platforms and Sensors
2. Physical and Cultural Signatures

F. Geographic Information System Applications (at instructor's discretion)
1. Exploring Tropical Cyclones
a. Recipe for a Cyclone
b. The Live of a Cyclone
c. Hurricane Hazards
d. Hurricanes in the Big Apple
2. Exploring the Dynamic Earth
3. Exploring Water Resources
a. Global Water Resources
b. The Renewable Resource
c. US Water Use
d. A Thirsty Town in the Desert

G. Earth-Sun and Seasonal Relationships
1. Determination of Sun's Declination, Altitude Angle
2. Determination of Duration of Daylight
3. Temporal and Spatial Distribution of Insolation

H. Multiple Applications in Weather Topics
1. Temperature Measures, Distribution, Cycles
2. Atmospheric Pressure/Winds and Oceanic Circulation
3. Atmospheric Moisture and Stability
4. Precipitation Processes/Distribution and Water Budgets
5. Frontal Analysis and Identification of Associated Weather Characteristics on Synoptic Charts

I. Climate Applications
1. Climate Controls
2. Climate Classification and the use of Climographs
3. Computer Simulations/Modeling of Climate Change

J. Soils Applications
1. Soil Properties
2. Classification
3. Soil Survey Map Interpretation

K. Vegetation Applications
1. Plant Identification and Adaptations
2. Classification
3. Climate, Soils, Vegetation Associations

L. Earth Materials
1. Mineral and Rock Classification and Identification
2. Landscape Expression

M. Landform Map/Image Analysis/Interpretation, Exercises, Simulations
1. Types
2. Processes
3. Spatial Distribution and Environments
4. Land Use and Modification
5. Drainage Patterns

VI. METHODS OF INSTRUCTION:

A. Laboratory Sessions 1. Short Introductory Lectures a. Chalkboard/Whiteboard Presentation b. Overhead Transparencies c. Web Sites
B. Individual and Group Work a. Laboratory Manual b. Topographic Maps c. GIS Investigations Workbook
C. Web-Based Resources 1. USGS Geography home page: http://geography.usgs.gov/ 2. About.com – Daylight Saving Time: http://geography.about.com/cs/daylightsavings/a/dst.htm 3. About.com – Equator, Hemispheres, Tropic of Cancer and Tropic of Capricorn: http://geography.about.com/library/misc/blequator.htm
D. Group Presentations (optional)
E. CD-ROM 1. ArcView® GIS software a. Exploring Tropical Cyclones b. Exploring the Dynamic Earth c. Exploring Water Resources 2. TASA Graphic Arts, Inc. Introduction to Topographic Maps
F. **Field Trips** - (optional) 1. Oakland Museum

VII. TYPICAL ASSIGNMENTS:

A. Laboratory Manual 1. Complete Exercise A: Geographic Grid, Shape and Size of the Earth, except for section A-3. Turn in the completed worksheets at the end of the laboratory period. B. Topographic Maps C. GIS Investigations Workbook 1. Complete Unit 1 in the Exploring Tropical Cyclones book: Recipe for a Cyclone. Be sure to answer all the questions, and follow along with the appropriate ArcView GIS application as directed. Present your workbook for instructor check-off at the end of the lab period.

VIII. EVALUATION:

A. **Methods**

1. Exams/Tests
2. Quizzes
3. Projects
4. Lab Activities
5. Other:
a. Methods
1. Laboratory exercises and assignments
2. Quizzes/Exams at instructor's discretion
3. Final Exam or Final Project

B. **Frequency**

1. Frequency
a. Weekly laboratory exercises and assignments

b. Recommend bi- or tri-weekly quizzes and final exam (or) two or three midterm (unit) exams and final exam
c. Student projects to be assigned at the discretion of the instructor

2. Typical Problems
   a. Laboratory Exercises
      1. Laboratory Manual
         a. Parallels and Meridians (a) Sketch in and label the following parallels of latitude: (1) 35oN (2) 10oS (3) Tropic of Cancer (4) Tropic of Capricorn (5) Arctic Circle (6) Antarctic Circle (Visible from this angle?)
         b. Sketch in an label the following meridians of longitude: (1) 10oW (2) 20oE (3) 58oW (4) 143oW (5) 0o (Prime Meridian) (6) 180o (International Date Line)
      2. Topographic Maps
         a. Reference (name of quadrangle):_____
         b. Quadrangles are also identified by the geographic grid coordinates of the lower right-hand corner:_____
         c. Is it a 15', or a 7 ½' quadrangle?
         d. Date of map: _____ Revision date(s)(?): _____
         e. The scale of the map is one of the first characteristics that you want to note. Identify at least three ways in which the scale of the quadrangle is presented in the legend.
         f. Contour interval: _____
         g. Grid systems other than the geographic grid are usually present, and are described in the legend. Identify at least two other grid systems on the map.
         h. What quadrangle joins this one on the south? (Eight adjoining quadrangles are identified.)
         i. What information is represented by these colors on the quadrangle? Blue: _____ Green: _____ Red: _____ Pink: _____ Brown: _____ Black: _____ Purple: _____
         j. Other types of information that are generally available in the map legend are: Organization(s) that produced the map: _____ Ordering information: _____ Dates of aerial photography: _____ Map projection: _____ Magnetic declination: _____
      3. GIS Investigations Workbook
         a. Exploring Tropical Cyclones Activity 1.2: Discovering cyclone patterns. Launch the ArcView GIS application, then locate and open the cyclones.apr project file. Open the Global Patterns view. Click the Media Viewer button and choose the Hurricane Andrew Movie fro the list. After the QuickTime Player application loads the file, play the button to view the movie. (a) In what direction do Andrew and Lester spin – clockwise or counterclockwise? (b) What happens to both storms when they cross over land?
         b. Now, look at the distribution of hurricanes on the map. Using the latitude lines on the map, estimate the northern and southern boundaries of the region where tropical cyclones form. (c) Most tropical cyclones form between about _____oN latitude and _____oS latitude.
         c. Look closely at the area near the equator. There appears to be a narrow "cyclone-free zone" centered on the equator. Using the Zoom In tool, zoom in on this cyclone-free zone, and use the Pan tool to drag the map along the equator. Move your cursor along the boundaries of the zone and note the latitude in the coordinate display at the right end of the tool bar. Use the Measure tool to measure the distance from the equator to the edge of the cyclone-free zone, as shown at the left. The distance (length) is given in the status bar. (d) The cyclone-free zone extends approximately _____ degrees or _____ kilometers from the equator.
         d. Click the Zoom to Full Extent button to display the entire map again. (e) Symmetrical patterns are very common in nature. In what areas of the world oceans, besides those very near the equator and the poles, would symmetry lead you to expect tropical cyclones to form, yet they don't? Identify these areas on the map below. (Students see a Mercator-Projection map of the world) (f) Explain why you expect tropical cyclones to form in these areas.
   b. Quizzes/Exams
      1. Calculate the oblateness of the Earth. (a) Print the formula and substitute equatorial and polar diameters in their appropriate positions in the formula. (b) Answer obtained from your calculator to four decimal places.
      2. A 40-inch circumference globe has a scale of 1 inch = 625 miles. The great circle distance between points A and B on the globe is 8 inches. Calculate the shortest distance, in miles, between points A and B on earth, using concepts (a), (b), and (c) specified below. Before you begin, draw a picture on the back of the first page with all of the appropriate information and relationships that will help you solve this problem by applying the three concepts. (a) Concept: length of 1o on a great circle equals approximately 69 miles. Show all appropriate "math" setups and the intermediate and final results obtained from your calculator. Intermediate answer (angle) to two decimal places: _____ Final answer to nearest mile (no decimal places): _____ (b) Concept: circumference of globe (inches) represents circumference of earth (miles). Show "math" setup and final result obtained from your calculator. Final answer to nearest mile (no decimal places): _____ (c) Scale concept (again, show "math" setup). Final answer to nearest mile: _____

IX. TYPICAL TEXTS:

1. Corbet, John H *Physical Geography Manual.* 5th ed., Kendall/Hunt, 2003.
2. Allen, John L *Student Atlas of World Geography.* 5th ed., McGraw-Hill, 2005.
3. Hall-Wallace, Michelle, et.al *GIS Investigations for the Earth Sciences package (with CDs).* 1st ed., Thompson – Brooks/Cole, 2003.
4. Christopherson, Robert W *Applied Physical Geography: Geosystems in the Laboratory.* 5th ed., Pearson/Prentice-Hall, 2003.
5. Computer and Internet access

X. OTHER MATERIALS REQUIRED OF STUDENTS:

A. Scientific calculator
B. Protractor
C. Straight edge
D. Sharp lead pencils
E. Colored pencils
F. Ruler
G. USGS topographic quadrangles (Livermore, Altamont, home/place of interest)
H. Campus print card