City College of San Francisco
Course Outline of Record

I. GENERAL DESCRIPTION
A. Date of Approval
   1. Updated
      June 1, 1999
      August 16, 2007
B. Department
   Earth Sciences
C. Course Number
   Geography 1
D. Course Title
   Physical Geography
E. Course Outline Preparer
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F. Department Chairperson
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G. Dean
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II. COURSE SPECIFICS
A. Hours
   Three (3) lecture hours weekly
B. Units
   3
C. Prerequisite
   None
D. Corequisite
   None
E. Advisory
   None
D. Course Justification:
   Physical Geography is a transferable natural science course that introduces
   fundamental processes and patterns in the physical environment, including
   weather and climate, hydrology, biogeography, geomorphology, and natural
   hazards.
E. Field Trips
   As required by course content
F. Method of Grading
   Letter
G. Repeatability
   0

III. CATALOG DESCRIPTION
An introduction to the Earth’s physical environment. Processes and patterns of
weather and climate, the development of landforms, plant and animal
distributions, and the interpretation of maps. Attention given to the physical
environment and natural hazards of California and the Bay Area.
IV. MAJOR LEARNING OUTCOMES
Upon completion of this course a student will be able to:

A. Identify and explain the distortions produced by basic map projections, and recognize the suitability of a projection for the study of various geographic phenomena.

B. Describe and explain the changes in Earth-Sun relations associated with the annual change of seasons.

C. Describe and explain the heating processes of the atmosphere, and the causes and significance of land-water temperature contrasts.

D. Evaluate and interpret global temperature patterns.

E. Describe and explain wind patterns around high and low pressure cells, and the general global atmospheric circulation patterns of wind and pressure.

F. Examine and explain the concept of relative humidity, and the relationships between relative humidity and adiabatic processes in the atmosphere.

G. Analyze and explain global patterns of precipitation.

H. Identify and describe the characteristics, location, and causes of typical midlatitude and tropical atmospheric disturbances and storms, including midlatitude cyclones, midlatitude anticyclones, and tropical cyclones.

I. Analyze and interpret the global distribution of climate types following the Köppen climate classification system, including the general location, characteristics and controls of each major climate type.

J. Analyze and assess evidence that supports the model of plate tectonics.

K. Explain the topographic features and tectonic activity associated with the three major kinds of plate boundaries, and how mantle plumes and terranes are incorporated into the model of plate tectonics.

L. Identify and explain the major kinds of faults and the most common landforms associated with faulting.

M. Examine and interpret the relationships between different kinds of magma, the style of volcanic eruption, and the types of volcanic mountains that develop from these magmas.

N. Describe and explain the major processes of mechanical and chemical weathering.

O. Identify and describe the main categories of mass wasting and the landforms typically produced by these processes.

P. Analyze and interpret processes of fluvial erosion and deposition, including common landforms produced by these processes.

Q. Describe and explain landforms associated with karst topography and hydrothermal processes.

R. Analyze and explain the characteristic conditions and special processes influencing landform development in desert regions.

S. Explain the coastal processes of erosion, sediment transport and deposition, and the typical landforms produced by these processes.

T. Explain the various processes of glacial erosion, transportation, deposition and glaciofluvial action, and the typical landforms associated with mountain and continental glaciation.
V. COURSE CONTENT
A. Introduction to Physical Geography
B. Latitude and longitude
C. Maps
   1. Map scale
   2. Equivalent versus conformal map projections
   3. Isolines
D. Earth-Sun Relations
   1. Factors responsible for seasonality
   2. Changing patterns of angle of sunlight and day length throughout the year
E. Introduction to the Atmosphere
   1. Composition and structure of atmosphere
   2. Elements and controls of weather and climate
   3. The Coriolis effect
F. Insolation and Temperature
   1. Electromagnetic radiation
   2. Basic heating and cooling processes in the atmosphere
   3. The greenhouse effect in the atmosphere
   4. Earth’s solar radiation budget
   5. Land-water temperature contrasts
   6. Global mechanisms of heat transfer—circulation of the atmosphere, surface ocean currents
   7. Global temperature patterns
G. Pressure and Wind
   1. Factors associated with formation of high pressure and low pressure cells
   2. Wind patterns associated with cyclones and anticyclones—surface versus upper atmosphere
   3. General circulation patterns in the atmosphere
   4. Monsoon wind patterns and localized winds
H. Moisture in the Atmosphere
   1. Actual water vapor content versus relative humidity
   2. Temperature-relative humidity relationship
   3. Adiabatic processes in the atmosphere—dry adiabatic rate vs. saturated adiabatic rate
   4. Atmospheric stability and air lifting mechanisms
   5. Cloud forms and families
   6. Global precipitation patterns
I. Fronts and Storms
   1. Air mass source regions and fronts
   2. Midlatitude cyclones
      a. Pressure and wind patterns; fronts and sectors
      b. Origin, movement and occlusion
   3. Midlatitude anticyclones
   4. Tropical cyclones (hurricanes)
J. Köppen Climate Classification
   1. Characteristics, location and controls of global climate types
      a. Af Tropical wet
      b. Aw Tropical savanna
      c. Am Tropical monsoon
      d. BWh Subtropical desert
      e. BWk Midlatitude desert
      f. Cs Mediterranean
      g. Cfa Humid subtropical
      h. Cfb Marine west coast
      i. Dfa Humid continental
      j. Dfc Subarctic
      k. ET Tundra
      l. EF Ice cap
      m. H Highland
   2. Mechanisms and evidence of global climate change

K. Biogeography and Biomes
   1. Biogeochemical cycles
   2. Global pattern of biomes

L. Introduction to Geomorphology

M. Rocks and Minerals

N. Plate Tectonics
   1. History and evidence supporting the model of plate tectonics
   2. Topographic features and tectonics of plate boundaries
      a. Divergent boundaries (spreading centers)
      b. Convergent boundaries
      c. Transform boundaries
   3. Mantle plumes and terranes

O. Vulcanism
   1. Magmas and eruption styles
   2. Types of volcanoes—shield, composite, plug dome, cinder cone
   3. Volcanic hazards—volcanic mudflows and pyroclastic flows

P. Folding

Q. Faulting
   1. Types of faults—normal, reverse, thrust, strike-slip
   2. Landforms associated with faulting

R. Weathering
   1. Mechanical weathering
   2. Chemical weathering

S. Mass Wasting
   1. Creep (soil creep)
   2. Fall (rockfall)
   3. Slide—Landslide and slump
   4. Flow—Earthflow and mudflow/debris flow
T. Fluvial Geomorphology
1. Fluvial erosion, transportation and deposition
2. Floodplain processes and landforms
3. Stream drainage patterns
4. Stream rejuvenation

U. Groundwater and Karst Topography
1. Karst processes and landforms
2. Hydrothermal features

V. Desert Processes and Landforms
1. Special conditions in deserts
   a. Desert hydrology
   b. Role of wind—sand dunes
2. Characteristic landforms in deserts

W. Coastal Processes and Landforms
1. Special processes along coastlines
   a. Waves
   b. Tides
   c. Long-term sea level changes
   d. Coastal sediment transport
2. Depositional landforms and sediment budget
3. Shorelines of submergence and emergence
4. Coral reef shorelines

X. Glaciation
1. The Pleistocene Epoch
2. Glacial erosion, transportation, deposition, and glaciofluvial processes
3. Landforms associated with continental glaciation
4. Landforms associated with mountain (alpine) glaciation

VI. INSTRUCTIONAL METHODOLOGY
A. Assignments
1. Reading from textbooks and handouts to provide basic understanding of topics detailed in V.
2. Out-of-class homework assignments that provide skills in understanding basic foundations of topics detailed in V, such as:
   a. Interpretation of weather maps
   b. Classification of climate data
   c. Interpretation of contour line maps
   d. Analyzing and interpreting tectonic data and maps
3. In-class group exercises that provide analytical and interpretive skills in topics such as:
   a. Global temperature patterns
   b. Global precipitation
   c. Global climate patterns
   d. Landform features as represented by topographic maps
B. Evaluation
   1. Three to four written exams (including a written final exam) that measure
      the student’s ability to achieve the objectives indicated in IV.
   2. Assignments as described in VI.A.2.

C. Texts and other materials
   1. Instructor-generated handouts.
   2. Textbook such as
      Tom McKnight and Darrel Hess, Physical Geography: A
      Landscape Appreciation, 9th edition. Upper Saddle River, NJ:
      
      or

      Robert Christopherson, Geosystems: An Introduction to Physical
      2006.

VII. REQUESTED CLASSIFICATION
     ( X ) CREDIT/DEGREE APPLICABLE (meets all standards of Title V. Section 55002(a)).