

San José State University
Department of Geography and Global Studies
GEOG 1, Geography of the Natural Environment, Sections 80, 81, Fall 2018

Course and Contact Information

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Class Days/Time:	online
Classroom:	none
GE/SJSU Studies Category:	Area B1

Course Format

This is an online course. Internet connectivity and a computer are required.

Course materials can be found on Canvas Learning Management System course login website at <http://sjsu.instructure.com>, under **Files** for this course. Assignments are all listed and described under **Assignments**. Any additional communications to the class will be made under Announcements. I may also send you personal messages or messages associated with each submission. We will try to communicate entirely within CANVAS.

Course Description

Atmospheric, biologic and geologic processes create the natural environments of the world. You will explore local, regional and global patterns in the location and distribution of environmental phenomena, and the human modification of natural patterns.

Course Goals and Learning Outcomes

This course is approved for General Education Core Physical Science area, B1. Upon successful completion of this course, students will be able to:

- 1: use the methods of science and knowledge derived from current scientific inquiry in life or physical science to question existing explanations. Evidence-based learning and discovery form the basis of scientific inquiry. The focus of this class is therefore on evidence, rather than belief. Challenges to existing explanations are approached through examination of evidence.
- 2: demonstrate ways in which science influences and is influenced by complex societies, including political and moral issues. The technical and cognitive methods of understanding used by researchers in physical geography are described throughout the course. The goal of achieving relative independence of the natural sciences from social belief systems is recognized, as is the influence of such belief systems on the process of achieving that

goal. The influence of the resulting comprehension of natural systems on human societies is emphasized throughout the course, particularly with regard to natural disasters like earthquakes, as well as the complex impact of climate change on social systems.

3: recognize the methods of science, including quantitative, analytical reasoning techniques.

The tools and methodologies of the physical geographical sciences, as well as the analytical and algorithmic reasoning techniques, are studied in some detail. Students shall understand how knowledge is achieved and improved on an ongoing basis.gh time; systems of classification; and physical processes of the natural environment.

Required Texts/Readings:

Textbook: <http://www.physicalgeography.net/fundamentals/contents.html>

The **Fundamentals of Physical Geography** (2nd edition) is a free online textbook with over 300 pages and 400 illustrations, photos and animated graphics. It is the work of two professors from the University of British Columbia Okanagan – Dr. Michael Pidwirny & Scott Jones. Important terms are hyperlinked to a glossary. There are links to study guide pages and additional reading within each chapter. Most importantly for the college student, Internet Weblinks are provided for each chapter that provide a wealth of well-respected sources of additional data and social media. I will only say this here, for those of you who have decided to read the syllabus: showing me in the work you give me (perhaps even only on what interests you the most) that you have followed some of these pathways into knowledge, and eventually understanding, is the most effective way of garnering a perfect or near-perfect grade from me, even if some of your other work wasn't quite perfect. But be sure to provide some kind of citation that would allow the reader to find that source directly. Internet sources require much more than a URL. Just as you would provide with regard to a book or article, I'd like the author(s), title, source or publisher, etc.

Other Readings

Other readings include 'climatechangeindicatorsreport2013', 'StayingSafeWhereTheEarthShakes_BayArea', and 'PuttingDownRootsInEarthquakeCountry_BayArea'. These readings are available in Canvas, under **Files**. Alternative means of downloading them are described in the Course Schedule, below.

Technology requirements

A computer with internet connection is required for this course. The computer display and connection should be capable of portraying video streams.

Course Requirements and Assignments

All homework assignments and Final Exam are described below and within Canvas **Assignments** for this course. Word or pdf files are acceptable. Other file types like may appear to get through but may be unreadable. Check back to read my comments associated with each document and its grade. Also check for additional messages from me to you, and routinely check the class **Announcements**. We will communicate entirely through CANVAS. Text me at 510-825-3506 if you have a pressing issue. Lateness is not a pressing issue.

Use 10 point font for all documents, with 1 ½ line spacing and normal margins. Please include the following information, formatted as you see fit, at the upper right of the first page of each submission: Your name; Geog1-80; Fall 2018; Homework #_.

Grading Information

Homework: Fourteen homework assignments and the Final Exam should be completed on or before the due dates, as described in the Course Schedule below. Please submit these responses via Canvas. All documents must be submitted even if late, before the final grade for the course is evaluated and submitted to SJSU.

Determination of Grades

Most homework assignments (6% each) x 12	72%
Homework assignments 4 and 12 (8% each) x 2	16%
Final Evaluation	12%
Total	100%

98% and above	A+
94% - 97%	A
93% - 90%	A-
89% - 87%	B+
86% - 84%	B
83% - 80%	B-
79% - 77%	C+
76% - 74%	C
73% - 70%	C-
69% - 67%	D+
66% - 64%	D
63% - 60%	D-
below 60%	F

SJSU classes are designed such that in order to be successful, it is expected that students will spend a minimum of forty-five hours for each unit of credit (normally three hours per unit per week), including preparing for class, participating in course activities, completing assignments, and so on. More details about student workload can be found in University Policy S12-3 at <http://www.sjsu.edu/senate/docs/S12-3.pdf>.

Note that “All students have the right, within a reasonable time, to know their academic scores, to review their grade-dependent work, and to be provided with explanations for the determination of their course grades.” See University Policy F13-1 at <http://www.sjsu.edu/senate/docs/F13-1.pdf> for more details.

University Policies

Per University Policy S16-9, university-wide policy information relevant to all courses, such as academic integrity, accommodations, etc. will be available on Office of Graduate and Undergraduate Programs' [Syllabus Information web page](http://www.sjsu.edu/gup/syllabusinfo/) at <http://www.sjsu.edu/gup/syllabusinfo/>

Geog1-80[81] / Geography of the Natural Environment, Fall 2018

Course Schedule

Week	Due Date	Readings, Assignments
1	8/24/18	<p>Access the text Fundamentals of Physical Geography at http://www.physicalgeography.net/fundamentals/contents.html</p> <p>Read CHAPTER 2: Maps, Remote Sensing, and GIS</p> <p>Each chapter of the online text Fundamentals of Physical Geography includes a Study Guide page. At the bottom of each Study Guide page is a list of Essay Questions. For selected chapters, you will be asked to address specific lists of selected questions, and/or additional questions. Responses to questions from the book may be largely copied and pasted from the text. Take your answers, at least in part, from the section of that chapter that discusses the topic at hand. Do NOT take them from the summary of the chapter. In general, about 60-70% of the text in your responses may be derived by judiciously copying from the textbook. Responses to any additional questions that are not from the text should be almost entirely in your own words. Not all questions require a long response, but many do. Put in the time, and revise your approach in light of your grades and my comments via CANVAS.</p> <p>Homework 1 (6%): Chapter 2 Essay Questions: 1, 7, 8, 9</p> <p>1. What is a map? What two basic forms do they come in? How are projection systems used to portray the Earth's surface on a map? What problems are associated with projecting the Earth's surface on a two-dimensional map?</p> <p>7. What is a topographic map? How does it use maps symbols to represent natural and human constructed features found in the environment? Why are contour lines found on this type of map and how are they used?</p> <p>8. What is remote sensing? What types of remote sensors have been developed to monitor the Earth? Describe some of the guiding principles of object identification that are used for feature recognition.</p> <p>9. What is a GIS? What types of activities are carried out on these computerized systems?</p>
2	8/31/18	<p>Listen: and take notes on the first hour of the following interview with climate scientist Joseph Romm. This is an audio podcast, which you can either download or listen to online. You may of course listen to the whole thing, but I ask you to take notes on only the first hour.</p> <p>https://www.samharris.org/podcast/item/what-you-need-to-know-about-climate-change</p> <p>Homework 2 (6%): This should require at least two to three pages (10pt font, 1 ½ spaced). Begin by briefly telling me who Joseph Romm is (do a Google search). Then summarize the discussion in the roughly first hour of this interview (which starts a few minutes into the podcast) in such a way as to convince me that you've listened to it carefully. Do not be concerned about expressing or critiquing your own political opinions or those of others. Keep in mind that we are interested primarily with the physical and biological sciences in this course. That is what the first hour is about.</p>

Week	Due Date	Readings, Assignments
3	9/7/18	<p>I will be in China for the next two weeks. In 1968, teens of my wife’s generation were sent to work on farms throughout China. This year is the 50th anniversary of those events. Along with a few of her comrades from that time, Cheri and I will be visiting the farm where she lived and worked for 3 ½ years. I will try to document this visit on video, and if any of my efforts are successful I will upload segments to YouTube. It will not be possible to communicate with me while I am abroad, and there will be some delay in grading your homework.</p> <p>Read CHAPTER 6: Energy and Matter</p> <p>Continue to follow the instructions regarding the textbook assignment for week 1. Try not to be too mechanical in your approach. Feel free to investigate other sources for questions you find particularly interesting.</p> <p>Homework 3 (6%): Essay Questions 3, 4, 5, 6, 7, 9, 10, 11, 12</p> <p>3. How do the three mechanisms of conduction, convection and radiation move energy from one place to another?</p> <p>4. Outline the three laws of thermodynamics.</p> <p>5. What is radiation? How is it created? What factors determine its quantity and quality?</p> <p>6. Verbally (i.e., using words rather than equations) define the Stefan-Boltzmann Law. What does it describe?</p> <p>7. Verbally define the Wien's Law. What does it describe?</p> <p>9. How does the Sun create the energy that drives most systems on the Earth?</p> <p>10. How does the tilt of the Earth's axis influence the annual solar insolation received at a site located at 50 degrees North latitude?</p> <p>11. What influence does Earth rotation have on solar insolation received at the equator?</p> <p>12. How does angle of incidence control the intensity of solar radiation received at the Earth's surface?</p>
4	9/14/18	<p>View: Look through the many pages of relatively short videos available from KQED: http://ww2.kqed.org/quest/tag/tag-video/ (note the ‘next page’ button at the bottom of each page).</p> <p>Homework 4 (8%): Choose any five videos, and write (in paragraph form, using at least ½ page per video), a summary and brief discussion of what you found most interesting about each of them and any questions they bring to mind. Indicate the title of each video as subheadings.</p> <p>Make sure to look through a few pages before making your selections. Don’t just stick with the first couple of pages. Your final document should be at least three or four pages long.</p>

Week	Due Date	Readings, Assignments
5	9/21/18	<p>Read CHAPTER 7: Introduction to the Atmosphere</p> <p>Homework 5 (6%): Essay Questions 3, 4, 5, 6, 7, 10, 13, 15, 21</p> <p>3. Why is ozone important for life on Earth? Where is it found and how is it formed? How is human activity influencing this important atmospheric gas?</p> <p>4. How is the incoming shortwave solar radiation from the Sun modified by the atmosphere and the Earth's surface?</p> <p>5. Describe the difference between the following two terms: heat and temperature.</p> <p>6. Describe the shortwave radiation cascade as it relates to the Earth's energy balance.</p> <p>7. Discuss how the Greenhouse Effect works. How has human activity over the last few centuries enhanced this natural process? How will global warming change the environment of the Earth?</p> <p>10. What is a hurricane? Where, when and why does it form? How is global warming likely to influence hurricane intensity and frequency?</p> <p>13. Discuss the formation and characteristics of the various types of thunderstorms.</p> <p>15. What factors are responsible for the altered micro-climate of urban areas?</p> <p>21. Why do urban areas have more energy available for the creation of sensible heat than rural areas?</p>
6	9/28/18	<p>View: Water Vapor Fuels Hurricanes https://ca.pbslearningmedia.org/resource/nves.sci.earth.hurricane/water-vapor-fuels-hurricanes/</p> <p>Include relevant discussions from your text as well as the videos when addressing the following questions.</p> <p>Homework 6 (6%):</p> <p>1. What is the primary function of the Aqua satellite? How does it monitor the production of water vapor?</p> <p>2. Why might molecules of water vapor be described as “little mobile solar collectors”?</p> <p>3. Describe the role of the Sun in the formation of thunderstorms.</p> <p>View: NOVA: Earth From Space Monitoring Earth's Water Vapor https://ca.pbslearningmedia.org/resource/nves.sci.earth.vapor/monitoring-earths-water-vapor</p> <p>4. What is a geostationary orbit? Why do you think it would be useful to have a satellite remain in orbit over one point on Earth? Why do scientists combine data from multiple satellites in geostationary orbit?</p> <p>5. Explain how topography, latitude, and other factors combine to change the impact of water vapor regionally.</p>

Week	Due Date	Readings, Assignments
7	10/5/18	<p>Read CHAPTER 8: Introduction to the Hydrosphere</p> <p>Homework 7 (6%): Essay Questions 1, 2, 3, 4, 5, 7, 10, 12, 16</p> <ol style="list-style-type: none"> 1. What is streamflow? How can it be expressed in a mathematical model? Describe the effect of an intense 1 hour storm on streamflow over 24 hours using a hydrograph. 2. What factors control the rate of evaporation on a soil surface? 3. Discuss the movement of water into soils. How and why does infiltration vary with time? 4. Why does runoff occur? 5. What forces influence the storage of water in the soil matrix? 7. Describe the mathematical equation used to model stream discharge. 10. What is potential evapotranspiration and how does it differ from actual evapotranspiration? What factors control the rate at which water leaves the Earth's surface by way of evaporation and transpiration? 12. Explain how relative humidity is measured. 16. Discuss how tides form. What is the difference between a Neap and Spring tide? Explain diurnal, semidiurnal, and mixed tides.
8	10/12/18	<p>Homework 8 (6%): Take two photos of some sort of natural phenomena that we have covered (or might have covered) so far. Make them informative and interesting shots; I don't want a picture of condensation of your water bottle. You might find that it is not often easy to convey with a camera what you experience as a human being, but if you keep this task in mind as you walk around, you might stumble onto something great. Embed your photos in your document, and provide an essay describing the science being displayed, as well as any other impressions you may have that the photo does not necessarily convey.</p> <p>I sometimes film 'ambient' scenes – shots that extend through time, which sometimes helps me to experience or relive a scene better than a series of short shots. Since we just went over the basics of hydrology, here for your entertainment are some films from a recent trip up China's greatest river, the Yangtze:</p> <p>The Three Gorges: https://youtu.be/yQ7lrqE_bKU</p> <p>The Three Gorges Dam: https://youtu.be/pPKV_GTI4gk</p> <p>Little Three Gorges: https://youtu.be/ZY9Ug2CXFwo</p>

Week	Due Date	Readings, Assignments
9	10/19/18	<p>Read CHAPTER 9: Introduction to the Biosphere</p> <p>Homework 9 (6%): Essay Questions 2, 3, 4, 5, 9, 11, 12</p> <p>2. Compare and contrast the function and structure of the grazing and detritus food chain.</p> <p>3. What is an ecosystem? How does it differ from a community? What are some of its important components?</p> <p>4. Evolution describes the process by which species come to possess adaptations. In an essay, describe how evolution works through natural selection, spatial isolation, and gene mutation.</p> <p>5. Explain in detail how energy moves through the grazing food chain and the detritus food chain. Also, discuss how these food chains are related to each other and are necessary for the cycling of nutrients in an ecosystem.</p> <p>9. What are some of the major components of ecosystems? How are these components related to each other?</p> <p>11. Discuss the term dispersal. Include in your answer an explanation of why organisms want to disperse, and how organisms accomplish this life-cycle strategy.</p> <p>12. Discuss Connell and Slatyer's three mechanisms of succession. Start your answer with a definition and an example of what is succession, and describe how succession begins.</p>
10	11/2/18	<p>Read CHAPTER 9: Introduction to the Biosphere</p> <p>Homework 10 (6%): Essay Question 14</p> <p>14. Compare and contrast the characteristics (climate, plant types, animal life, soil types, etc.) of the following biomes: Tundra, Temperate Deciduous Forest, Desert, and Tropical Rainforest.</p> <p>View: Plants Affect the Atmosphere</p> <p>https://ca.pbslearningmedia.org/resource/nves.sci.earth.atmosphere/plants-affect-the-atmosphere/</p> <p>Include relevant discussions from your text as well as the videos when addressing questions.</p> <p>A1. What primary components of Earth's atmosphere do plants modify through photosynthesis and respiration?</p> <p>A2. How do photosynthesis and respiration relate to one another?</p> <p>A3. How have plants contributed to making Earth a habitable planet?</p> <p>A4. Describe how Earth's atmosphere changes over the course of 24 hours.</p> <p>A5. Why does the Amazon rainforest have such a dramatic impact on the atmosphere?</p> <p>View: NOVA: Earth From Space Lightning Produces Nitrates</p> <p>Continued on next page</p>

Week	Due Date	Readings, Assignments
		<p>https://ca.pbslearningmedia.org/resource/nves.sci.earth.nitrate/lightning-produces-nitrates/</p> <p>A6. On average, how many lightning strikes occur on Earth each second?</p> <p>A7. Describe how lightning forms.</p> <p>A8. How does lightning produce nitrate?</p> <p>A9. Why is nitrate important for living things?</p> <p>A10. How does nitrate produced in clouds end up in human bodies?</p>
11	11/9/18	<p>Read: CHAPTER 10: Introduction to the Lithosphere</p> <p>Homework 11 (6%): Essay Questions 6, 14, 15, 16, 17, 20</p> <p>6. What geologic features are found at the boundaries of tectonic plates? Briefly explain how plate tectonics is responsible for their formation or occurrence.</p> <p>14. What is a volcano? Where and why do they form? Describe the five different types of volcanoes.</p> <p>15. Describe the various physiological features associated with the Earth's terrestrial surface.</p> <p>16. Describe the various physiological features associated with the Earth's ocean basins.</p> <p>17. Outline the various processes of physical, chemical, or biological weathering.</p> <p>20. Describe the physical characteristics of a location that would favor each of the following types of mass movements: rockfall, rockslide, mudflow, slump, and creep.</p>
12	11/16/18	<p>Read: StayingSafeWhereTheEarthShakes_BayArea.pdf PuttingDownRootsInEarthquakeCountry_BayArea.pdf</p> <p>These documents are available in Canvas, under Files. They are also downloadable from the USGS: https://www.earthquakecountry.org/library/StayingSafeWhereTheEarthShakes_BayAreaEdition.pdf https://pubs.usgs.gov/gip/2005/15/gip-15.pdf</p> <p>Homework12 (8%): Describe the type of earthquakes that occur in the Bay Area, in terms of tectonic plates. Then describe steps that might be taken before, during, and after a major destructive earthquake, from the perspective of a family member, and/or neighbor, public servant, health care worker, business officer, or planner, etc. in order to reduce suffering and loss. Assume that the earthquake has caused casualties, and that people around you may be in need of first aid, at the very least. Assume that you are not trapped, i.e. that you have the ability to move and do things. You may be at work, or school, at home or on the streets. You may fictionalize your account, or you may write in the manner of the USGS documents,</p>
13	11/23/18	Thanksgiving vacation

Week	Due Date	Readings, Assignments
14	11/29/18	<p>View: Nutrients from Deep-Sea Vents https://ca.pbslearningmedia.org/resource/nves.sci.earth.hydro/nutrients-from-deep-sea-vents/</p> <p>Include relevant discussions from your text as well as the videos when addressing questions.</p> <p>Homework 13 (6%):</p> <ol style="list-style-type: none"> 1. What is a hydrothermal vent? 2. Describe the process by which hydrothermal vents produce nutrient-rich water. 3. What did scientists see in NASA's Aqua satellite data that indicated a phytoplankton bloom? <p>View: NOVA: Extreme Ice Ice-Core Record of Climate https://ca.pbslearningmedia.org/resource/nvei.sci.earth.climate/ice-core-record-of-climate/</p> <ol style="list-style-type: none"> 4. What is an ice core? 5. What happened to the level of carbon dioxide in the atmosphere about 125,000 years ago? 6. What is the relationship between greenhouse gases in the atmosphere and global temperatures and sea level?
15	12/7/18	<p>Read: CHAPTER 10: Introduction to the Lithosphere</p> <p>Homework 14 (6%): Essay Questions 21, 25, 28, 32, 33, 34</p> <ol style="list-style-type: none"> 21. What is a glacier? What conditions are necessary for a glacier to form? Why did continental glaciers form over certain specific regions of the North American continent? 25. How do glaciers influence the surface configuration of the Earth by way of erosion and deposition? 28. How does beach drift and longshore drift move sediment along coastlines? 32. Describe some of the landforms common to environments influenced by eolian processes. 33. Describe some the important characteristics of soil. 34. What five factors are important in pedogenesis? Explain. Outline how the pedogenic processes operate.
	12/14/18	<p>Read: climatechangeindicatorsreport2013.pdf (available from Canvas, under Files).</p> <p>This report is also downloadable directly from California's Office of Environmental Health Hazard Assessment (OEHHA): https://oehha.ca.gov/media/downloads/risk-assessment/document/climatechangeindicatorsreport2013.pdf</p> <p>FINAL EXAM (12%): List and describe at least six likely changes in California in the near future associated with climate change, according to this report, in terms of the science we have covered in this class.</p>