UNIVERSITY OF THE FRASER VALLEY

ORIGINAL COURSE IMPLEMENTATION DATE: May 2014
REVISED COURSE IMPLEMENTATION DATE: September 2017
COURSE TO BE REVIEWED: (six years after UEC approval) September 2022
Course outline form version: 09/15/14

OFFICIAL UNDERGRADUATE COURSE OUTLINE FORM

Note: The University reserves the right to amend course outlines as needed without notice.

Course Code and Number: GEOG 103	**Number of Credits:** 4 Course credit policy (105)
Course Full Title: The Physical Environment **Course Short Title (if title exceeds 30 characters):**	
Faculty: Faculty of Social Sciences	**Department (or program if no department):** Geography and the Environment

Calendar Description:

This course explores, through a scientific and quantitative framework, how physical processes shape the natural environment. It focuses on the interconnected processes of the atmosphere, hydrosphere, lithosphere, and biosphere. Impacts of human activities on the natural environment are also discussed.

Note: Field trips outside of class time will be required. Please refer to the department website for field trip scheduling information.
Note: Students with credit for GEOG 101 or GEOG 102 cannot take this course for further credit.

Prerequisites (or NONE):	None.
Corequisites (if applicable, or NONE):	
Pre/corequisites (if applicable, or NONE):	

Equivalent Courses (cannot be taken for additional credit)
Former course code/number:
Cross-listed with:
Equivalent course(s): **GEOG 101 or GEOG 102**
Note: Equivalent course(s) should be included in the calendar description by way of a note that students with credit for the equivalent course(s) cannot take this course for further credit.

Transfer Credit
Transfer credit already exists: ☒ Yes ☐ No
Transfer credit requested (OReg to submit to BCCAT):
☐ Yes ☒ No (if yes, fill in transfer credit form)
Resubmit revised outline for articulation: ☐ Yes ☐ No
To find out how this course transfers, see **bctransferguide.ca**.

Total Hours: 90
Typical structure of instructional hours:

Lecture hours	40
Seminars/tutorials/workshops	
Laboratory hours	40
Field experience hours	10
Experiential (practicum, internship, etc.)	
Online learning activities	
Other contact hours:	
Total	90

Special Topics
Will the course be offered with different topics?
☐ Yes ☒ No
If yes, different lettered courses may be taken for credit:
☐ No ☐ Yes, repeat(s) ☐ Yes, no limit
Note: The specific topic will be recorded when offered.

Maximum enrolment (for information only): 25

Expected frequency of course offerings (every semester, annually, every other year, etc.): Every semester

Department / Program Head or Director: Steven Marsh	**Date approved:**	December 2016
Faculty Council approval	**Date approved:**	January 2017
Campus-Wide Consultation (CWC)	**Date of posting:**	March 17, 2017
Dean/Associate VP: Lucy Lee (Science)/ Jacqueline Nolte (Arts)	**Date approved:**	January 2017
Undergraduate Education Committee (UEC) approval	**Date of meeting:**	March 24, 2017

Learning Outcomes

Upon successful completion of this course, students will be able to:

1. Describe the use of the scientific method to tackle real-world problems.
2. Explain the conceptual and methodological scientific frameworks for the examination of the physical environment.
3. Evaluate scientific information, published in a variety of sources, used to explain natural processes.
4. Explain the ethical issues faced when conducting science.
5. Explain the importance of temporal and spatial scales to scientific research.
6. Articulate the scientific theories that explain the natural processes shaping the physical environment through the lens of the scientific method.
7. Describe the impact of human activities on the physical environment.
8. Analyze geographic data to explain physical processes through experimentation and/or primary data collection.
9. Demonstrate competence in basic geographical skills including: the interpretation of topographic maps; the construction of topographic cross-sections; using handheld GPS units; visualization of the landscape using Google Earth; and use of basic weather instruments.
10. Demonstrate competence in quantitative data analysis including: the construction and reading of graphs; the visual and mathematical analysis of topographic maps; collection, presentation and analysis of meteorological data to explain weather phenomena;
11. Communicate geographic concepts using various scientific techniques (written, numeric, graphic and oral).

Prior Learning Assessment and Recognition (PLAR)

☒ Yes ☐ No, PLAR cannot be awarded for this course because

Typical Instructional Methods (guest lecturers, presentations, online instruction, field trips, etc.; may vary at department's discretion)

The course typically includes lectures, assigned readings, discussion groups, videos, use of online resources, laboratory assignments, field work, experimentation, data collection and analysis, and guest lecturers.

Grading system: Letter Grades: ☒ Credit/No Credit: ☐ Labs to be scheduled independent of lecture hours: Yes ☒ No ☐

NOTE: The following sections may vary by instructor. Please see course syllabus available from the instructor.

Typical Text(s) and Resource Materials (if more space is required, download Supplemental Texts and Resource Materials form)

	Author (surname, initials)	Title (article, book, journal, etc.)	Current ed.	Publisher	Year
1.	Christopherson, R.W., Birkeland, G., Byrne, M-L, Giles, P.	Geosystems: An introduction to physical geography. 4th Canadian edition	☐	Upper Saddle River, NJ: Pearson Ed.	2016
2.	Gervais, B.	Living Physical Geography	☐	Macmillan	2015
3.	Topical Science Papers/ News Articles		☐		

Required Additional Supplies and Materials (software, hardware, tools, specialized clothing, etc.)

Rite-in-Rain Notebook, Pencil Crayons, Graphing Paper, scientific calculator, geometry set

Typical Evaluation Methods and Weighting

Final exam:	%	Assignments:		Midterm exam:	%	Practicum:	%
Quizzes/tests:		Lab work:	%	Field experience:	%	Shop work:	%
Field trip/ class participation:	%	Lab exam:	%	Lab Project/report/journal::	%	Total:	100%

Details (if necessary): Given the different models of course delivery in GEOG 103, two examples of evaluation methods are presented:

Example 1:
Lab assignments – 20%
Lab exam – 20%
Field trip or participation – 10%
Mid-term exam – 25%
Final exam – 25%

Example 2:
Lab assignments – 20%
Lab exam – 20%
Assignments – 20%
Lab project/report – 15%
Quizzes/tests – 25%

Typical Course Content and Topics

GEOG 103 is taught by multiple instructors who use different models of course delivery to meet learning outcomes. Two examples of course content are provided here:

Example 1:

Lectures

1. *Introduction to Physical Geography and the Scientific Method*: An overview of the scientific method and an introduction to the terminology used in physical geography. This topic also identifies the earth systems discussed in the course: lithosphere, atmosphere, hydrosphere and biosphere.
2. *Geomatics*: This topic introduces the concepts of mapping and map projections. It outlines key geographic concepts of coordinate systems, and discusses the different geographic techniques used to visualize and analyze the Earth.
3. *The Earth Energy System*: This unit discussed earth structure and the processes that affect the surface of the earth. It will also discuss the concepts of geologic time and dating methods.
4. *The Atmosphere System*: In this topic, the concepts of radiation, seasonality and energy budgets will be introduced. Variations in energy budgets as a result of geographic location, proximity to the ocean and season will be discussed.
5. *The Oceanic Engine*: Oceanic circulation and the importance of ocean currents in modifying global climate are discussed. El Nino is also discussed.
6. *Water, Weather and Climate Systems*: The hydrological cycle, the role of water in the atmosphere and adiabatic processes are discussed in this topic. Clouds, mid-latitude cyclones and hurricanes are also covered here.
7. *Plate Tectonics*: This topic introduces the unifying theory of plate tectonics from a scientific method framework and identifies the various lines of evidence used to support this theory.
8. *Earthquakes:* Students will be introduced to the terminology of earthquakes with linkages to plate tectonic theory, comparison of magnitude and intensity of events and the interpretation of seismic waves. Examples from the Cascadia Subduction zone will be used to highlight concepts. Concerns around emergency preparedness will be discussed.
9. *Volcanism*: Volcano types, and location in relating to plate boundaries is introduced. Volcano hazards and preparedness is also outlined.
10. *Weathering and Mass Movements*: Concepts of physical and chemical weathering are discussed. Types of mass wasting and associated hazards are introduced.
11. *River, Coastal and Glacial Systems*: This topic discusses the concepts of erosion and deposition using examples of river, glacial and coastal landforms.
12. *Soils*: Soil classification and soil characteristics are introduced using examples from the Fraser Valley. The importance of soil to the local economy is introduced.
13. *Ecosystems*: This topic introduces concepts of biodiversity and evolution and looks at the relationships between landscape, climate and biology.

Example 2:

Unit 1 - Introduction to geographic science: An overview of the scientific method and an introduction to the terminology used in physical geography. This topic also identifies the earth systems discussed in the course: lithosphere, atmosphere, hydrosphere and biosphere. Concepts of mapping and map projections, coordinate systems, and the different geographic techniques used to visualize and analyze the Earth are discussed.

Unit 2: Natural Hazards & emergency preparedness: The unifying theory of plate tectonics from a scientific method framework is analyzed through primary data sources together with the identification of key plate boundary characteristics. The characteristics of the Cascadia Subduction Zone is highlighted Students will be introduced to the terminology of earthquakes & volcanoes with linkages to plate tectonic theory, comparison of magnitude and intensity of events and the interpretation of seismic waves. Emergency preparedness will be discussed.

Unit 3: Landscapes of Canada: The processes of erosion and deposition will be described using examples of river, glacial and coastal landforms. An emphasis on landforms in Canada is used.

Unit 4: Climate Change: Theoretical concepts of radiation, energy budgets, temperature patterns and seasonality will be discussed. Students will evaluate the scientific arguments for climate change and research predictions for climate change in BC.

Unit 5: Severe Weather: The hydrological cycle, the role of atmospheric moisture in driving the climate system will lead to an analysis of the processes responsible for producing winds, mid-latitude cyclones, tornadoes and hurricanes. Issues related to emergency preparedness and risk assessment will be discussed.

Unit 6: Biogeography of BC: This topics will introduce concepts of biodiversity, evolution, soils, biomes and biogeoclimatic zones of BC. Soil classification and soil characteristics are introduced using examples from the Fraser Valley. The importance of soil to the local economy is introduced.

In both examples, the following labs may be covered (note that between 8 and 10 labs are taught in GEOG 103 depending on instructor):

- *Lab 1- Introduction to Earth, Graphs and Numerical Calculations*: application of basic computational techniques used in physical geography, construction and analysis of graphs; introduction to concepts of geographic location using coordinate systems.
- *Lab 2 - Radiation, Energy Balance and Temperature Variations*: analysis & calculation of radiation budget data, graph construction and interpretation, interpreting quantitative temperature data
- *Lab 3 - Humidity and Adiabatic Processes*: analysis and construction of basic weather symbols and weather maps, construction and analysis of temperature profile diagrams, collection and analysis of primary meteorological data

- *Lab 4 - Adiabatic Process and Surface Weather Maps*: construction and interpretation of isobar maps, analysis of temperature profile diagrams
- *Lab 5 - Mapping Skills: Map Scale, UTM & Latitude/Longitude*: application of latitude/longitude and UTM coordinate systems to location features on topographic maps; calculate scale and apply it to map analysis.
- *Lab 6 - Mapping Skills: Topographic Profiles, Gradients and Google Earth*: Interpretation and analysis of contour lines; calculating topographic gradient; use Google Earth to visualize landforms in 3D.
- *Lab 7 - Coastal Systems and Landforms, Area and Azimuths*: analyze topographic maps and contour lines to identify coastal landforms; determine azimuths and bearings from topographic maps.
- *Lab 8 - Glacial Processes and Landforms*: construct topographic profiles, calculate vertical exaggeration; understand the importance of vertical exaggeration for landform analysis; use contour line patterns to identify alpine and continental glacial features.
- *Lab 9 - Biogeography and Soil Characteristics*: analysis of soil profiles, soil texture and soil colour using geographic standards; calculating soil characteristics (porosity, permeability etc.)
- *Lab 10 - Global Positioning Systems (GPS) and UTM Coordinates*: use handheld GPS units to navigate between locations using UTM and/or latitude/longitude coordinate systems.
- *Lab 11 - Natural Hazards*: use seismographs and travel time curves to determine the epicentres of earthquakes; describe hazards associated with seismic activity.
- *Lab 12 - Calculating Your Carbon Footprint*: collection and analysis of personal carbon footprint data, construction and analysis of graphs, evaluation of scientific information