douglas college **Course Information**

A: Division: ACADEMIC DATE: September 29, 1993

B: Department: SCIENCE & MATHEMATICS New Course: X

Revision of Course Information form: _____

DATED: _____

C: GEOL 200 (Subject & Course No.) D: ENVIRONMENTAL GEOLOGY-NATURAL HAZARDS (Descriptive Title) E: 4 (Semester Credit)

F: Calendar Description

This course considers the origin and geomorphological nature of a variety of natural hazards such as earthquakes, volcanic eruptions, landslides, etc., and methods of prediction and mitigation. The geological aspects and social impact of several important environmental issues such as hazardous waste disposal will also be discussed. Participation in field trips will be required.

Summary of Revisions:
(Enter date & section)
Ex: Section C,E,F, &R

G: Type of Instruction:

	Hours Per Week/ Per Semester	
Lecture	2	Hrs.
Laboratory	4	Hrs.
Seminar		Hrs.
Clinical Experience		Hrs.
Field Experience		Hrs.
Practicum		Hrs.
Shop		Hrs.
Studio		Hrs.
Student Directed Learning		Hrs.
Other		Hrs.
TOTAL	6	HOURS

H: Course Prerequisites:
Geol 120 or 121 or SCI 107
OR GEOG 120 per Des Wilson Dec 8/95

I: Course Corequisites:
None

J: Course for which this course is a pre-requisite
None

K: Maximum Class Size:
35

L: College Credit Transfer X

College Credit Non-Transfer _____

M: Transfer Credit:
Requested X
Granted ___
Specify Course Equivalents or Unassigned Credit as Appropriate

U.B.C. GEOL 251
S.F.U. GEOL (4)
U. Vic. EOS (1.5)
OTHER:

Desmond Wilson
COURSE DESIGNER(S)

DIVISIONAL DEAN

DIRECTOR/CHAIRPERSON

REGISTRAR

N: Textbooks and materials to be purchased by students
Use Bibliographic Form)

1. Keller, E.A., (1982) Environmental Geology, 6th Ed. MacMillan Pub.
2. Environmental Geology/Natural Hazards Lab Manual - Douglas College

---

Complete Form with Entries Under the Following Headings:

O. Course Objectives; P. Course Content; Q. Method of Instruction;

R. Course Evaluation

O. Course Objectives

Upon completion of this course the student will be able to:

1. Show an appreciation of the role the geological sciences have to play in the search for solutions to environmental problems.
2. Show an understanding of the origins of several types of natural hazards and the approaches used in mitigating these hazards.
3. Show an understanding of the social implications of natural hazards with respect to a variety of cultural settings.
4. Describe the geomorphological and geological characteristics of several types of natural hazards. Identify a variety of landforms produced by a number of geomorphic processes and show an understanding of how these landforms are created.
5. Describe the problems and possible solutions associated with the disposal of toxic and hazardous wastes.
6. Describe the impact of natural hazards on land use planning and show an understanding of the need for adequate assessment of such hazards.
7. Demonstrate an understanding of environmental regulation.
8. Show an understanding of the importance of natural resources and the environmental impact of their use.
9. Demonstrate an understanding of the concepts described above in the context of regional or local problems.
10. Demonstrate an ability to analyse geomorphic terrains through the use of topographic maps, air photographs and landsat images.

P. **Course Content:**

A. **LECTURE TOPICS:**

1. Introduction: Philosophy and Fundamental Principles

2. Earth Materials - a review: minerals, rocks, soil,
   rock forming processes
   the rock cycle

3. Plate Tectonics - an overview: global tectonics, megageomorphology,
   structure of the earth
   isostasy, eustasy

4. Earthquakes: occurrence, prediction, mitigation, perception
   case study 1. San Francisco
   2. Lower Mainland of B.C.

5. Volcanic Activity: occurrence, prediction, mitigation, perception
   case study 1. Mount St. Helens
   2. Philippines

6. Mass Wasting: Slope stability gravity, mechanics
   role of climate, water, vegetation
   role of human activity
   case study 1. Debris torrents - Squamish Highway
   2. Landslides/rockslides:
   i) Hope Slide
   ii) Rubble Creek

7. River Flooding: drainage basins/watersheds
   fluvial processes/mechanics
   sediment transport
   urbanization/forestry practices
   prediction/mitigation
   case study 1. Fraser River
   2. Capilano/Seymour Watersheds

8. Coastal Hazards Shoreline processes - coastal erosion - mitigation
   case study: Point Grey, White Rock
   tropical cyclones, tidal floods, tsunamis
   case study: S.E. U.S.A.

9. Water: water supply/management
   water pollution - surface/groundwater
   acid mine drainage
   case study: 1. Groundwater contamination -
   Love Canal, Fraser Valley
   2. Windy-Craggy Site

10. Waste Disposal: Solid waste
    Toxic waste
    Sewage Treatment
    Radioactive waste
    Ocean Dumping
    case study: 1. Hanford Reserve
    2. GVRD waste disposal system

11. Glacial/Periglacial Processes: Permafrost, solifluction
Engineering problems
ice falls/avalanches
case study: Mackenzie Valley Pipeline

12. Land Use Planning: Site selection/evaluation
Environmental impact assessment
Environmental law/regulation
case study: Site C Dam

13. Global Change - an overview: Earth System Science
Global Warming
Ozone Depletion
Acid Rain
Air pollution

B. **LABORATORY TOPICS:**

1. Rocks and minerals - an overview
2. Particle size analysis
3. Topographic map interpretation
4. Air Photo Interpretation
5. Seismic Hazard mapping
6. Volcanic Landform/hazard
7. Fluvial Lab - landforms, drainage basins
8. Debris Torrent
9. Slope stability
10. Groundwater contamination
11. Coastal landforms - engineering problems
12. Land Use - site selection/evaluation

Q. **METHOD OF INSTRUCTION:**

1. The primary mode of instruction will involve lectures and laboratories. Attempts will be made to integrate these within each instructional block of time.
2. At least two weekend field trips will be made to view local problems.
3. Readings will be assigned to supplement lectures.
4. Audio-visual aid will be used where appropriate.
5. Guest lectures may be used periodically.

R. COURSE EVALUATION:

This course evaluation will consist of:

1.	Midterm examination	30%
2.	Term projects/Field trip reports/lab reports (at least 4)	40%
3.	Final Examination	30%