



**School of Arts & Science**  
**CHEMISTRY AND GEOSCIENCE DEPARTMENT**  
**GEOS 110- 001**  
**Earth-Ocean-Atmosphere System**  
**2008 Fall**

## COURSE OUTLINE

[The Approved Course Description is available on the College web site](#)

### 1. Instructor Information

(a)	Instructor:	Alan Gell		
(b)	Office Hours:	tba		
(c)	Location:	F 344B		
(d)	Phone:	370-3446	Alternative Phone:	
(e)	Email:	<a href="mailto:gella@camosun.bc.ca">gella@camosun.bc.ca</a>		
(f)	Website:			

### 2. Intended Learning Outcomes

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

1. Describe and interpret short-term and long-term Geologic, Oceanic and Atmospheric processes and their interactions.
2. Make hypothesis-based scientific observations, analyze and interpret quantitative data with reference to Geologic, Oceanic and Atmospheric processes.
3. Discuss the energy budget of the atmosphere, and its short-term and long-term variability.
4. Describe the atmospheric circulation system
5. Interpret relationships among temperature, salinity and density of seawater, and how these properties vary over time.
6. Describe ocean current transport and be able to assess the role of currents in global heat transfer.
7. Describe relationships among surface ocean currents and atmospheric circulation.
8. Relate ocean-floor topography and ocean depth data to processes of sea-floor spreading and the age of ocean basins.
9. Discuss the circulation of the solid earth and plate tectonic processes.
10. Relate recycling of the elements to circulation of earth, ocean and atmosphere.
11. Discuss evolution of earth and atmosphere, and short- and long-term climate change.
12. Describe processes involved in global warming.
13. Understand the nature and distribution of atmospheric ozone and mechanisms of ozone depletion.

### 3. Materials

(a)	<b>OPTIONAL</b> Text	The Earth System, Kump, Kasting and Crane, Pearson Publ, 2 <sup>nd</sup> ed.
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Calculator, coloured pencils

### 4. Course Content and Schedule

**Lectures: Mon, Wed, 3:30 – 4:50, F300; Lab: Tues 3:30 – 6:20, F300**

Topic	Reading
Introduction to the course	
Global change on short timescales	Ch. 1, p. 1 - 10
Global change on long timescales	Ch. 1, p. 10 - 17
Systems concepts	Ch. 2, p. 18 - 23
Feedback in Earth systems	Ch. 2, p. 23 - 33
Electromagnetic radiation	Ch. 3, p. 34 - 41
Earth's energy balance	Ch. 3, p. 41 – 43
Composition & structure of the atmosphere	Ch. 3, p. 44 - 54
The movement of air	Ch. 4, p. 55 - 61
General circulation of the atmosphere	Ch. 4, p. 61 - 68
Moisture in the atmosphere	Ch. 4, p. 68 - 72
Global hydrologic cycle	Ch. 4, p. 72 - 82
Oceanic circulation: surface currents	Ch. 5, p. 83 - 87
Boundary currents	Ch. 5, p. 87 - 91
Circulation of the deep ocean	Ch. 5, p. 91 - 96
Thermohaline circulation and climate	Ch. 5, p. 96 - 103
Structure of the solid earth	Ch. 7, p. 117 - 126
Plate tectonics	Ch. 7, p. 126 - 132
Plate boundaries	Ch. 7, p. 133 - 137
Driving forces of plate tectonics	Ch. 7, p. 137 - 146
Introduction to the carbon cycle	Ch. 8, p. 147 - 152
The short-term carbon cycle	Ch. 8, p. 153 - 158
The long-term carbon cycle - Part 1	Ch. 8, p. 158 - 167
The long-term carbon cycle - Part 2	Ch. 8, p. 167 – 172
Origin and evolution of the Earth and atmosphere	Ch. 10, 11, parts

Long-term climate regulation	Ch.12, parts, espec. 236-249
Evidence of Pleistocene glaciations	Ch. 14, p. 270 - 274
Milankovitch cycles and glaciations	Ch. 14, p. 274 - 279
Glacial climate feedbacks	Ch. 14, p. 279 - 283
More glacial climate feedbacks	Ch. 14, p. 283 - 288
Holocene climate change	Ch. 15, p. 289 - 299
The Little Ice Age	Ch. 15, p. 299 - 306
Introduction to ENSO	Ch. 15, p. 306 - 312
More short-term climate variability	Ch. 15, p. 312 - 316
The carbon cycle and global warming	Ch. 16, p. 317 - 324
Future climate projections	Ch. 16, p. 324 - 334
Global warming and public policy	Ch. 16, p. 334 - 342
Stratospheric ozone and UV radiation	Ch. 17, p. 343 - 353
Changes in stratospheric ozone	Ch. 17, p. 353 - 357

## 5. Basis of Student Assessment (Weighting)

(a)	Assignments	10 labs X 2.5 %
(b)	Exams	Midterm 1 - 15%, Midterm 2 - 15%, final – 20%
(c)	Other (eg, Attendance, Project, Group Work)	Project 25%

## 6. Grading System

### Standard Grading System of Arts and Science

## 7. Recommended Materials or Services to Assist Students to Succeed Throughout the Course

### LEARNING SUPPORT AND SERVICES FOR STUDENTS

There are a variety of services available for students to assist them throughout their learning. This information is available in the College calendar, at Student Services or the College web site at [camosun.ca](http://camosun.ca).

### STUDENT CONDUCT POLICY

There is a Student Conduct Policy **which includes plagiarism**. It is the student's responsibility to become familiar with the content of this policy. The policy is available in each School Administration Office, at Student Services and on the College web site in the Policy Section.