

# VARIED APPROACHES TO GEOSCIENCE LEARNING

## INTRODUCTION

**100-LEVEL COURSES ARE EITHER FOCUSED ON GENERAL OR ON SPECIFIC GEOLOGICAL TOPICS. THESE VARIOUS CLASS OPTIONS ALSO EMPLOY DIFFERENT PEDOGOGICAL APPROACHES.**

### GENERAL COURSES:

- G103:** EARTH MATERIALS AND PROCESSES
- G104:** EVOLUTION OF THE EARTH
- G105:** EARTH, OUR HABITABLE PLANET
- G111:** PHYSICAL GEOLOGY (*Majors*)
- G112:** HISTORICAL GEOLOGY (*Majors*)

### TOPICAL COURSES:

- G114:** DINOSAURS AND THEIR RELATIVES
- G116:** OUR PLANET AND ITS FUTURE
- G121:** METEORITES AND PLANETS
- G131:** OCEANS & OUR GLOBAL ENVIRONMENT
- G141:** EARTHQUAKES AND VOLCANOES
- G171:** ENVIRONMENTAL GEOLOGY
- G188:** VOLCANOES OF THE SIERRA NEVADA

### OBJECTIVES & BENEFITS:

DIVERSE INTRODUCTORY CLASSES LEAD TO:

- ILLUSTRATION OF SUBJECT BREADTH
- ENHANCED TOTAL ENROLLMENTS
- MULTIPLE CATCHMENTS FOR MAJORS
- FACULTY TEACHING IN THEIR SPECIALITY
- USE OF VARIED PEDAGOGIC STRATEGIES
- ACCOMMODATION OF LEARNING STYLES
- A WIDE RANGE OF LEARNING ACTIVITIES

## COMPONENTS OF 100-LEVEL CLASSES

### EXAMPLES OF COURSE EMPHASIS:

- G103:** USES INTERACTIVE ON-LINE MULTIMEDIA LEARNING MODULES. (*G116 is similar*)
- G104:** LABS COMPLEMENTED BY ON-LINE QUIZZES.
- G111:** INTEGRATES LABS WITH FIELDWORK.
- G131:** WEB-BASED EXERCISES EXPLORING OCEANOGRAPHIC DATA REPLACE LABS .
- G188:** A SUMMER FIELD-BASED CLASS FOCUSED ON HAZARDS AND ENVIRONMENTAL ISSUES.

COMPONENTS	GENERAL					TOPICAL						
	103	104	105	111	112	114	116	121	131	141	171	188
LECTURES	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
LAB CLASSES	✓	✓	✓	★	✓	✓	✓	✓	✓	✓	✓	✓
FIELDWORK	✓	✓		★	✓	✓	✓	✓	✓	✓		★
DISCUSSIONS								✓	✓			
PROJECTS					✓							★
ASSIGNMENTS												
GROUP WRITING			✓			✓		★	✓			
WEB-BASED INTERACTIVE MULTIMEDIA	★	✓				✓	✓	★	✓	✓	✓	✓

✓ = included      ★ = emphasis

## EXAMPLES OF ACTIVITIES

**LECTURES & LABS:**  
WITH IN-CLASS EXERCISES AND DISCUSSIONS.

G131



FIELDWORK WITH G188 & G104

### FIELDWORK:

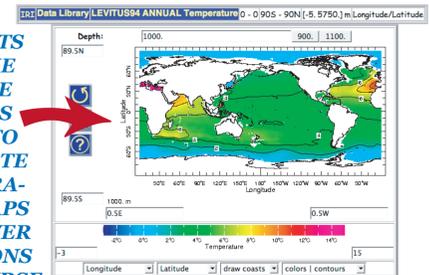
- G188:** SUMMER IN THE SIERRA NEVADA.
- G104:** TRIPS TO LOCAL OUTCROPS IN LABS.

### Ocean Temperatures and Salinities at Depth

The aim of this part of the exercise is to explore how temperatures and salinities vary with depth. It employs the same data sets as the preliminary questions for this topic, except that it focuses on global rather than regional characteristics. Maps of ocean temperatures and salinities are obtained by use of the [Levitus Atlas](#), which is explained directly in the following link: [Global Guidelines](#). Images of global ocean temperatures at a selection of depths are available [here](#).

9. What is the global range of temperatures AND salinities at 1km depth (i.e. for the North and South Atlantic and the North and South Pacific)? Give specific values for different areas of the ocean. (10 points)
10. How globally uniform are ocean temperatures and salinities at 1km depth? Describe the similarities and differences in temperatures and salinities with reference to values for specific locations. (5 points)
11. What is the global range of temperatures AND salinities at 4km depth (i.e. for the North and South Atlantic and the North and South Pacific)? Provide specific examples of values for different regions. (10 points)
12. How globally uniform are ocean temperatures and salinities at 4km depth? Provide examples of temperatures and salinities from different locations to justify your answer. (5 points)
13. Are there any anomalous (i.e. markedly higher or lower) temperature and/or salinity characteristics within the global ocean at 1km? If so where do they occur and what is the nature (i.e. the temperature or salinity values) of the anomaly? How would you explain this phenomenon? (5 points)

STUDENTS USE THE ON-LINE LEVITAS ATLAS TO GENERATE TEMPERATURE MAPS TO ANSWER QUESTIONS IN ONCOURSE



### WEB-BASED ON-LINE EXERCISES:

- G131:** INTERPRETS DATA FOR 'QUAKES, PLATE MOTION, TEMPERATURE & SALINITY, TIDES, ATMOSPHERIC GASES, PRODUCTIVITY, ETC.

ASSESSMENT OF A LEAKY LANDFILL

### MULTIMEDIA:

- G116:** INCORPORATES MANY INTERACTIVE ASSIGNMENTS THAT REQUIRE USE OF GEOLOGIC DATA IN PROBLEM SOLVING.

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