

INDIANA UNIVERSITY OF PENNSYLVANIA
SENATE CURRICULUM COMMITTEE B-2

NEW COURSE PROPOSAL

Department: Geoscience

Person to contact for further information: Karen R. Cercone

Course affected: GS 332 - Geochemistry

Desired semester of change: Spring 1988

Approvals:

Department Curriculum Committee Chairperson: _____

Department Chairperson: _____

College Advisory Committee Chairperson: _____

College Dean: [Signature]

A. DESCRIPTION OF ACADEMIC NEED

A1. Catalog Description: _____ (PLEASE ATTACH)

A2. Course Syllabus: _____ (PLEASE ATTACH)

A3. Need Fulfilled: Students planning to attend graduate school should have this course on their transcript. It introduces them to the fundamental chemical interactions that control low-temperature (ie., earth surface) geologic processes. It will also be valuable for students seeking employment in the environmental sciences. It is designed for upper-level majors.

A4. Effect on other courses: No other courses presently deal with the topics covered in this course. It will provide an ideal optional package, along with Environmental Geology and Hydrogeology for students interested in the environmental sciences.

A5. Does this course follow traditional offerings in the department? Yes, It will
be a 3-credit course with 2 hours of lecture and 3 hours of lab.

A6. Has this course been offered at IUP on a trail basis? It is being offered
now as GS 481 (a special topics courses)

A7. Is this a dual level course? No

A8. Do other universities offer this course? It is a standard part of many
undergraduate geology programs. At Penn State it is required for all
geology majors: at Slippery Rock and Pitt it is a strongly recommended
elective.

A9. Is this course recommended or required by a professional society? No

B. INTERDISCIPLINARY IMPLICATIONS

B1. Will the course be offered by one instructor or will there be a team? _____

One

B2. Are additional or corollary courses needed? Prerequisites are CH 111/112
and GS 121/ 122 or permission of instructor.

B3. What is the relationship of the content of this course to the content of
courses offered by other departments?

It does not duplicate any courses being taught elsewhere on campus.

B4. Is this course applicable in a program of the school of continuing education
directed at other than full-time students?

Possibly

C. EVALUATION

C1. What procedures are expected to be used to evaluate student progress? _____

Lab exercises, three hourly exams and 1 final will concentrate on developing students' quantitative skills. An oral presentation will focus on developing their conceptual understanding of aqueous geochemistry.

C2. Variable credit? No

D. IMPLEMENTATION

D1. What resources are needed to teach this course? _____

Existing resources are adequate.

D2. How many sections? One

D3. How often will the course be offered? Every other year.

D4. How many students will be accommodated? 15

Catalog Description

A1. GS 332 GEOCHEMISTRY

2e-3l-3sh

Prerequisite: CH 111/112; GS 121/122; or permission of instructor.
Introduction to low-temperature chemistry of the earth's surface and near-surface; includes discussions of chemical activity, solution chemistry, organic geochemistry, trace elements, isotopes and the chemistry of natural waters.

GEOCHEMISTRY SYLLABUS
 SPRING 1987

	LECTURE TOPIC	LAB TOPIC	READING IN DREVER (1982)
1/21	Terms and units	Working terms	Chapters 1 & 2
23	Thermodynamics		
26	Gibbs Free Energy	Acids & bases	
28	Chemical potential		
30	Activity coefficients		
2/ 2	Equilibrium constants	Carbonate chemistry	Chapter 3
4	Acids & bases		
6	pH control by carbonates		
9	Alkalinity	Precipitation	
11	Complexes and chelates		
13	Stability of minerals		
16	Stability diagrams	Fluid mixing	Chapter 6
18	Kinetics		
20	"Equilibrium" in groundwater		
23	FIRST HOURLY EXAM	Discussion	Chapter 12
25	Organic geochemistry		
27	More organic geochemistry		
3/ 2	Organics in groundwater	Organic pollutants	Chapter 11
4	Redox reactions		
6	NORTHEAST GSA		
9	Eh-pH diagrams	Redox in nature	
11	Eh-pH of groundwater		
13	Diffusion & dispersion		
March 16-20	SPRING BREAK		
23	Trace elements	Water plumes	Chapter 13
25	Trace elements in groundwater		
27	Isotope chemistry		Chapter 15
30	Stable isotopes	Trace metals	
4/ 1	Stable isotopes in groundwater		
3	Radioactive and radiogenic isotopes		
6	SECOND HOURLY EXAM	Discussion	Chapter 7
8	Water-rock interaction		
10	Feldspar dissolution		

13	Ion exchange	Shale filtration	Chapter 4
15	River/spring chemistry		Chapter 8
17	Lake chemistry		
21	Ocean chemistry	Salt divides	Chapter 10
22	Ocean chemistry through time		
24	Brine chemistry		Chapter 9
27	Groundwater chemistry	Dating groundwater	
29	Groundwater chemistry		
5/ 1	GEOSCIENCE SEMINAR		
4	Groundwater chemistry		

GEOCHEMISTRY
SPRING 1987

Instructor: Karen Rose Cercone

Office: 112 Walsh
(also known to hang out in 339 Weyandt)

Phone: 357-2379
357-8353 (home)

Office hours: Monday 2:15-5:15
Tuesday 10:30-11:30
Wednesday 4:15-5:15

Course objectives: Introduce the basic principles of low-temperature aqueous geochemistry and review the practical geologic problems which geochemical analysis can solve.

Course mechanics: Three 1-hour exams (essay and problem-solving) will each be worth 100 points; a 20-minute seminar report will also count 100 points; 10 problem sets and/or article reviews will be worth 10 points each.

Final grades will be calculated as a percentage of the total, with 90-100% = A; 80-89% = B; 70-79% = C; etc.

Laboratory: Each week on Wednesday you will be given either a problem set to solve or a scientific article to review (in a written paragraph or two). These lab assignments are due the following Monday and will be graded and returned by that Wednesday so that we can discuss them in lab. Lab periods after the two Monday exams will be used to hand the exams back and discuss them, so that there will be no lab assignments due on those Mondays.

Text: Drever, The Geochemistry of Natural Waters. Until it arrives in the bookstore, xeroxes of assigned chapters will be placed on the reserve shelf in Walsh 104. Additional xeroxes of lab-assigned articles and chapters from other texts for optional reading will also be put on this shelf.