**ENVIRONMENTAL GEOLOGY**
GEOL 3323 - Section 001
Fall 2002

**Contact:** Moira.Ridley@ttu.edu  
Office: 324 Science Building  
**Office hours:** Monday 1:30 - 3:00pm  
Thursday 1:00 - 3:00pm

Supplemental reading: The Earth System, L.R. Kump, J.F. Kasting and R.G. Crane

**Grading:** Grading will be based on your performance in two mid-semester exams, a final exam and on three assignments.

<table>
<thead>
<tr>
<th>Assignment Type</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>2 assignments each worth</td>
<td>10%</td>
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<tr>
<td>1 assignment</td>
<td>15%</td>
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<tr>
<td>2 mid semester exams each worth</td>
<td>20%</td>
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<tr>
<td>Final exam (Comprehensive)</td>
<td>25%</td>
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**Grading Policy:** Grades will be posted across from Room 234, Science Building. Identification will be the last 5 digits of your social security number. Grades will not be emailed

<table>
<thead>
<tr>
<th>Grade</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>A</td>
<td>90-100 %</td>
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<tr>
<td>B</td>
<td>80-89 %</td>
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<tr>
<td>C</td>
<td>70-79 %</td>
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<tr>
<td>D</td>
<td>60-69 %</td>
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<tr>
<td>F</td>
<td>less than 60%</td>
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**Important Dates:**  

<table>
<thead>
<tr>
<th>Date</th>
<th>Event</th>
<th>Notes</th>
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</thead>
<tbody>
<tr>
<td>September 26</td>
<td>Exam 1</td>
<td></td>
</tr>
<tr>
<td>October 17</td>
<td>First assignment due by 12:20</td>
<td>Coal-fired Power Plant 10%</td>
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<tr>
<td>November 7</td>
<td>Exam 2</td>
<td></td>
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<td>November 12</td>
<td>Second assignment due by 12:20</td>
<td>Landfill Siting 10%</td>
</tr>
<tr>
<td>November 26</td>
<td>Third assignment due by 12:20</td>
<td>Case Studies 15%</td>
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<tr>
<td>December 9</td>
<td><strong>FINAL EXAM 1:30pm</strong></td>
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**Course Outline:**

- Introduction: Earth Systems Science
- Atmosphere: Global Energy Balance and Climate
- Hydrosphere: Ground and Surface Waters
- Geosphere: Soils and Biogeochemical Cycles
- Energy and Mineral Resources
- Geology and Health
- Waste Management
- Natural Hazards
- Environmental Impact and Land Management

Any student who, because of a disability may require special arrangements in order to meet course requirements should contact the instructor as soon as possible to make any necessary accommodations. Students should present appropriate verification from Access TECH in the Student Counseling Center in West Hall. All policies presented in *The Bulletin of Texas Tech* will be adhered to strictly.
The aim of this assignment is for you to become familiar with some environmental issue, or a natural or anthropogenic hazard that has had significant impact on the environment, economy of a region, or has had some political impact. A further aim is for you to evaluate the merits of scientific material that appears in the popular press versus scientific articles, and to form an opinion on some topic that you can present to a forum (i.e. the class). Your opinion must be backed with scientific data and facts.

You will write a paper on some topic that will be assigned in class. In addition, you will present your paper, as a brief “case study” to the class. Presentation dates will be assigned throughout the semester. The presentations will be grouped into broad topics, and complement the material covered during regular lectures.

Guidelines

Paper
Scientific format: Introduction, discussion, reference list, etc.
you may include subheadings / subsections for clarity.
Figures & Tables: All copied figures and tables must be relevant and have captions.
Length: 3 - 4 pages (excluding figures, tables and references)
Format: Double spacing, size 12 font, 1 inch margins.
References: Newspaper articles or equivalent, and web sites may be included
You should try to include at least one scientific article that did not appear in either a newspaper or on a web site.
If the web is used for references the complete web-address must be given
Note - All web sites will be checked, therefore, a complete web address is essential, and points will be deducted for missing or incorrect web addresses.
Grading: 15%
A grade of ‘A’ will only be given if you present some original opinion on your assigned topic, or pass some judgement on the scientific merits of the references cited. All opinions and judgments must be substantiated with scientific facts.

Presentation
Length: approximately 3 minutes
Visual aid: visual aids such as one or two overheads are recommended
Content: a brief overview of your topic highlighting the geologic / environmental importance and relevance

In some instances more than one person will be assigned the same topic. When that is the case, you may work together and discuss your presentations, but you must present individual unique papers and seminars.

Some examples of points you may address
History of the issue; geologic information and setting; government policy and intervention either at the federal or state level; public opinion; human, local and regional environmental impact; economic impact; was human health adversely affected and could the harm have been avoided.
If your topic relates to a natural hazard: what predictions were made prior to the disaster, where there any geologic explanations for the disaster; could anything have been done to minimize the damage caused.
ASSIGNMENT 3: PRESENTATION DATES

Presentation: Tues Sept. 24th
El Niño
Kyoto agreement
CO₂ emission policies
The transport of dust and pathogens from Africa and Asia to the USA

Presentation: Tues Oct. 8th
Water issues in Lubbock and the South Plains: Lake Alan Henry or selling of water rights
Water pollution - The Exxon Valdez oil spill
The Owen’s Valley water war in California

Presentation: Tues Oct. 15th
The fate of the Everglades
The Colorado River and the dams along it e.g. Hoover Dam
Wetlands

Presentation: Tues Nov. 5th
Environmental issues surrounding oil drilling/mining in Alaska
China’s Three Gorges Dam
Fossil fuels - Acid rain e.g. Poland’s ‘black triangle’
Nuclear reactor accident in Chernobyl

Presentation: Tues Nov. 19th
Carcinogens in contaminated water related to the Mississippi River - Louisiana / New Orleans
Nuclear waste storage - Yucca Mountain
Love Canal

Presentation: Thurs Nov. 21th
Disasters along the Pacific Rim
Earthquakes and tsunamis - must have occurred since 2000
The volcanic eruption of 1973 in Iceland

Presentation: Tues Nov. 26th
Volcanism - must have occurred since 2000
Mass wasting - Landslides, Subsidence
Tropical storms / hurricanes must have occurred since 2000
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**Text:** Principles and Applications of Geochemistry, 2nd Edition, G. Faure  
Supplemental reading: Thermodynamics of Natural Systems, G. M. Anderson  
Geochemistry, 2nd Ed., A.H. Brownlow

**Grading:** Grading will be based equally on performance in exams and on problem sets. There will be two *take-home* exams, and near-weekly problem sets (typically 10 to 12).

- Mid semester exam 25%
- Final exam - comprehensive 25%
- Problem sets 50%

**Important Dates:**
- October 23: Mid semester exam handed out
- October 31: Mid semester exam due by Noon
- December 2: Final exam handed out
- December 4: Last day of classes
- December 10: Final exam due by Noon - No Exceptions

**Course Outline:**
- Introduction
- Atomic structure / Periodic Table / Bonding and crystal chemistry
- Thermodynamics
- Aqueous geochemistry
- Mineral Stability - Activity diagrams
- Redox chemistry
- Radiogenic isotope geochemistry / geochronology
- Stable isotope geochemistry

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