Strategic minerals are commodities that are essential to the national defense, but are subject to potential supply disruptions. Critical minerals are commodities that perform an essential function for which few or no satisfactory substitutes exist. The list of critical and strategic minerals consists of, but is not limited to: rare earth elements (REE), lithium, platinum group elements (PGM), antimony, rhenium, beryllium, tantalum, cobalt, chromium, tin, tantalum, tellurium, niobium, tungsten, gallium, yttrium, bauxite, and germanium. These elements have captured international attention due to their application in a range of developing markets such as consumer electronic devices, electric and hybrid vehicles, wind turbines, solar panels, energy efficient lighting and medical diagnostic equipment. In this course, we will examine the economics, occurrence, geology, uses, and politics of some of these commodities. Field trips will examine deposits in New Mexico and adjacent states.

The class will meet one day TBD, 4-7 PM, B227 for ~120 minutes with the remaining time spent on field trips or in occasional extra discussion sessions with visiting scientists. The first class will be Monday Jan 12, 2015, 4PM, B227 (Bureau conference room).

WEEK OF:
January 12—Introduction: Strategic and critical minerals definition and overview
19—Basic concepts: Geology, types of deposits, mining, and processing
26— Commodities: Introduction, products using critical minerals

February 2—Rare earth elements
9—Rare earth elements—cont
16—**Midterm exam** (Take Home), Annual SME meeting in Denver (15-18), no class
23—Rare earth elements—cont

March 2—Commodities—beryllium
9—Platinum group metals, cobalt
13-22—Spring break, no class
23—Sustainable development
30—Tellurium, gallium, indium

April 06—Commodities
13—Commodities
20—Commodities
27—Present research results in class (15 mins); **Final exam given out** (Take Home)

May 07—**Final Exam, research report** due by noon on May 7th

Textbooks
Kogel, J.E, Trivedi, N.C., Barker, J.M., and Krukowski, S.T., 2006, ed., Industrial Minerals and Rocks, 7th edition: Society for Mining, Metallurgy, and Exploration, Littleton, Colorado—available online from SME at student price $193 if you become a member online (use McLemore member #2142500 as recommendation) to get this price (save more $ than membership costs plus you should all be members of SME anyway) NOTE: I also have this on CD for anyone not wanting to buy it.


Papers as assigned

Class Details
Exams: Midterm and Final—both are take home exams that will emphasize short answer and essay questions.

Term project—you are required to do a research project that will involve some original work. You can work on this as a team.

Discussion—we will assign papers to be read prior to class to be discussed by the class with one of you leading us. Each class member will be responsible for researching and leading the discussion (15 min) on one commodity.

Field trips—there will be 2 or more field trips and a field report on each trip will be required.

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<th>Basis for final grade</th>
<th>Midterm</th>
<th>Final (comprehensive)</th>
<th>Lab exercise</th>
<th>Term project</th>
<th>Class Participation, field trips</th>
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