Economic Geological Resources

Earth Sciences 107

Section: J100

Term: 2008 Fall

Instructor: Dr. Peter Mustard

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Discussion Topics: General: REQUIREMENT DESIGNATION: B-Sci

An overview of the Earth's major economic geological resources for non-Earth Science majors or minors. Background on major Earth processes which produce significant natural resources including metallic resources, hydrocarbon and other energy resources, industrial mineral and groundwater resources. Much of the focus will be on the changing nature of how these resources have been found and exploited through history and how this may evolve (or not) in the near and distant future.

Course Topics:

1. How we use the Earth.

Modern society and Earth resources in terms of the World's resource needs at present and in the future. What are the major resources and how do we use them? What are the consequences of increasing population and industrial capacity on resource demands?

2. Understanding Earth Processes.

Plate Tectonics and how it directly or indirectly controls everything that happens on Earth. Major igneous, metamorphic and sedimentary processes and how they cause environments suitable for resources to form and concentrate in economic amounts.

3. Energy Resources.

Fossil fuels from peat to methane and everything in between. Other energy resources including nuclear, hydroelectric and significant "alternate" energy sources.

4. Metallic resources.

Metals, their properties and how major ore deposits form. The major metals and the rare metals and how we use them. Issues of metallic deposit exploration, economics, mining and waste management.

5. Industrial Resources.

Non metallic minerals and mineral resources for gemstones, fertilizers, foods, medicines and other chemical additives and general industrial uses. Minerals and rocks as building materials. Groundwater and other water deposits as major resources.

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6. The Future of Earth’s Resources.

Challenges to meeting the resource needs of a growing population base expecting to join or continue a "1st world" lifestyle, how finite are Earth’s resources? What are the alternatives for energy, mineral and water resources?

Course Organization: Two 1.5 hour lectures per week.

Grading: Midterm Exam 1: 20%

Midterm Exam 2: 20%

Final Exam: 60%

Required Texts: Resources of the Earth: Origin, Use and environmental Impact., J.R. Craig, D.J. Vaughan, and B.J. Skinner, 3rd Edition, 2001. Prentice-Hall Publications. ISBN 0-13-083410-6

Recommended Texts: None.

Materials/Supplies: None.

Prerequisite/Corequisite: None.

Notes: This course cannot be used by EASC majors or minors for credit towards EASC required or optional courses, or as optional Science course requirements.