



The University of Sydney

# GEOS2114

## Volcanoes, Hot Rocks & Minerals

**Lecturers:** Dr Derek Wyman (dwyman@geosci.usyd.edu.au)  
Prof Geoff Clarke (geoffc@mail.usyd.edu.au)  
Dr Patrice Rey (prey@geosci.usyd.edu.au)  
School of Geosciences

**Classes:** Lectures: Tue & Thur 11am in Madsen Lab Room 332  
Practical: Tue 1–3pm or 3pm–5pm in Madsen Lab Room 332

### Course Synopsis & Aims

This unit of study relates plate tectonics to a) volcanoes and their hazards; b) geological processes in the deep crust; c) the formation of precious metal and gemstone ores around the Pacific Rim; and d) an understanding of how Earth's materials (minerals, rocks, rock formations, lithospheric plates etc.) respond to stresses and the forces that deform them. Methods of analysis involve studies at the microscopic scale (performed on thin sections) and the mesoscopic scale performed on hand specimens and outcrops. The unit includes a two to three day field trip to study an extinct volcano in NSW.

**GEOS 2914:** Practical component differs from GEOS 2114 with more in-depth analysis of petrography and petrology concepts and principles.

### Anticipated Outcomes

By the end of this course, you will:

- be able to identify common igneous and metamorphic rock-forming minerals
- be able to identify the main types and settings of Earth's volcanism and related hazards
- have a general knowledge of the geological setting and industrial application of common mineral commodities
- consider issues involved in resource exploration and extraction in a community-based context.
- Be able to use fractures and faults to conduct palaeostress analysis, which is a fundamental constraint for hydrocarbon and mineral exploration, as well as risk assessment of seismically active regions

### Assessment

**Igneous:** Practicals:10%; Mt Canobolas Field trip: 10% Quiz 5%

**Ore Deposit** project: 10%

**Metamorphic** Practical - quiz: 10%

**Structural** Practicals 10%

**Final Theory Exam** (Igneous, Ore Deposits, Metamorphism, and Structural):  
45%

Course notes have been printed for the volcano section of the course and include materials for metamorphic geology and copies of structural geology web pages

For online “magmatic” and “metamorphic” learning materials see also:

<http://www.odp.usyd.edu.au/Clarke04/Hyperpetmag/WELCOME.htm>

<http://www.odp.usyd.edu.au/Clarke04/Hyperpetmet/WELCOME.HTM>

Lecture content for structural geology can be found via:

<http://www.geosci.usyd.edu.au/users/prey/Teaching/Teach.html>