

Syllabus: Rocks and Minerals

This course should be called crystals, minerals and rocks because before you can understand minerals you have to know something about crystals and before you can understand rocks you have to know something about minerals.

Part 1: Crystallography

Concept of a space lattice and unit cell. The 14 Bravais lattices. Indexing lattices. The crystal systems. Symmetry elements. Plotting planes and axes on a stereogram. The 32 crystal classes. Miller indices and crystal faces. Crystal forms. Plotting poles to forms on a stereogram. The forms present in some selected crystal classes, including positive and negative forms, first and second order forms, and left and right-handed forms. Twinned crystals.

Part 2: Mineralogy

Division into rock-forming minerals and ore minerals. Identifying minerals by macroscopic physical properties. Classification of the non-silicate minerals by chemical composition and the most important representatives of each class. The rock-forming silicate minerals: feldspars, feldspathoids, olivines, pyroxenes, amphiboles, garnets, and micas. Accessory silicate minerals. The clay minerals. Classification of silicate minerals based on their internal structure.

Part 3: Petrology

Igneous processes and the classification of igneous rocks. Magmatism and tectonics.

Sedimentary rocks, clastic and non clastic including the evaporites. Concept of sedimentary facies. Maturity of a clastic sediment. Sedimentary structures.

Metamorphic rocks. Concept of metamorphic facies. Contact metamorphism. Regional metamorphism and the development of metamorphic fabric. Retrograde metamorphism.

Cataclastic rocks—breccias, orthogneisses, mylonites and pseudotachylites.

Tests: Crystallography—Feb 25
Mineralogy—March 24
Petrology—Official end-of-semester exam period.

Texts: Simon & Schuster's Guide to Rocks and Minerals will suffice though it lacks any treatment of stereograms and skimps on the crystal forms.

Klein's Mineral Science has no treatment of rocks but is an authoritative reference on crystallography and mineralogy and would be an invaluable addition to your permanent geological library if you plan to make geology your profession.

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