

SIO 152 Intro to Petrology & Petrography SP 2021
Instructor: Emily J. Chin (Van Allen in Blink)
TA: Ben Gruber

Grade breakdown: 15% midterm, 15% final, 50% lab/proble sets, 20% quizzes & participation

Required readings (all uploaded as pdfs on Canvas). All assigned readings are required. Please do not share or circulate any of the lecture materials, readings, or any other course material (including recorded lectures) outside of anyone enrolled in the class.

Weekly Quizzes will be open book, assigned on Friday and due following Wednesday. They will be based on the readings and lecture materials that week.

The Syllabus below is tentative and subject to change.

Focus of course & learning objectives:

- Understand the processes responsible for forming igneous and metamorphic rocks
- Understand how the chemical composition, structure, and texture of rocks can be used to interpret past geologic processes and geologic history of Earth
- Gain a basic understanding of rock ID, using hand samples, optical microscopy, and field identification
- Compile, analyze, and model geochemical data using computer programs and spreadsheets

| WEEK | DATE | LECTURE TOPICS | LAB/PROBLEM SET | READINGS |
|------|------|--|--|---|
| 1 | 3/29 | Magmas, melting in the Earth Composition & classification of magmas – major elements Surface expressions – magmatic structures | #1: Mineralogy review & petrology calculations | Best Ch. 1 Best Ch. 2 |
| 2 | 4/5 | Source of magmatism – the mantle Composition & classification of magmas – trace elements Isotopes | | Best Ch. 11 (pp. 283-290) Lee Ch. 7 Notes Glazner Ch. 2 |
| 3 | 4/12 | Melting & crystallization: mid-ocean ridges Intro to model systems & phase diagrams: binary eutectic melting of Fo and Di – analog for MORB Phase diagrams cont'd: Fo-Di-Si | #2: Digital image processing & ternary plots | Glazner Ch. 3, 4 Best Ch. 5 |
| 4 | 4/19 | Phase equilibria cont'd: ternary systems The Basalt Tetrahedron Tholeiitic magmas | #3a: Trace element models of melting #3b: Equilibrium crystallization | Best Ch. 12 Best Ch. 5 |

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| | | | Short midterm review | |
| 5 | 4/26 | Midterm – Monday Wed/Fri – continue ternary systems (granitic rocks) | #4: Olivine fractionation & Rhodes diagram | |
| 6 | 5/3 | Subduction zones – geodynamic context Origin of the calc-alkaline magma series | #5: Rocks under the microscope I (mafic, ultramafic) optional in person | Best Ch. 11.4 Best Ch. 13.7 Glazner Ch. 6 |
| 7 | 5/10 | Cont'd subduction zone – plutons, batholiths Intraplate magmatism | | Glazner Ch. 8,9,10 [Glazner Ch. 7] |
| 8 | | Intro to metamorphic rocks | #6: Hand samples & Rocks under the microscope II (granitoids) optional in person | Best Ch 14, 15 |
| 9 | | Metamorphic petrology continued | #7 Hand samples & Rocks under the microscope III Metamorphic rocks | Passchier & Trouw assigned chapters |
| 10 | | Geochronology and Bringing it all together – history of Earth through petrology isotopes | | |