

## EPS 302 Petrology

Instructor: Dr. Ben Black (He/Him) Wright 213  
Lecture Classroom: Wright 308/339  
Lab Classroom: Wright 339  
Email: bblack@eps.rutgers.edu  
Office hours: Via Zoom: M 2:20-3:20 PM, or email for an appointment  
Lab instructor: Jaclyn Watters  
Lecture MW at 1:00 PM to 2:20 PM

### Course Description

*Origin of Earth's crust and mantle through the study of igneous, metamorphic and sedimentary rocks.*

The formation of igneous and metamorphic rocks is a key part of chemical and physical processes that shape the surface and interior of Earth and other planets. This course offers an introduction to igneous and metamorphic petrology. Topics include rock classifications; melt generation; magma differentiation; phase diagrams; diffusion; trace elements; isotopes; mid-ocean ridge, arc, and flood volcanism; metamorphic facies; pressure-temperature histories; and will touch on the igneous geology of the Tri-State area.

Class	Date	Topic
1	Sep 1 (W)	Introduction to Igneous Petrology
2	Sep 6	NO CLASS (Labor Day)
3	Sep 8	Intro to Classifications and Physical Volcanology (read NYT article on volcanoes)
4	Sep 13	Thermodynamics: Gibbs Free Energy and the Phase Rule
5	Sep 15	Phase diagrams – binary
6	Sep 20	<i>Field Trip to Snake Hill, Watchungs</i>
7	Sep 22	Phase diagrams – ternary
8	Sep 27	Major Elements (Phase diagrams HW due)
9	Sep 29	Trace Elements
10	Oct 4	Isotopes / Review of Chemistry and Phase Diagrams (bring review questions!)
<b>11</b>	<b>Oct 6</b>	<b>Exam 1</b> (Prof Black on field work)
12	Oct 11	Melting and magma generation
13	Oct 13	Mid-ocean ridge volcanism
14	Oct 18	Subduction Zone volcanism
15	Oct 20	Intraplate volcanism
16	Oct 25	Crystallization and magma differentiation (Geochemistry HW due)
17	Oct 27	Granitoids and Continental Crust
18	Nov 1	Large Igneous Provinces
19	Nov 3	Rifts
20	Nov 8	Review of Magma Genesis and Settings (bring review questions!)
<b>21</b>	<b>Nov 10</b>	<b>Exam 2</b>
22	Nov 15	Intro to Metamorphic Petrology
23	Nov 17	Metamorphic Facies and Reactions
24	Nov 22	Metasediments & Metabasalts
25	Nov 24	NO CLASS (Thanksgiving break)
26	Nov 29	Geobarometry (PT-t paths)
27	Dec 1	Ore deposits / Diffusion (Read Rosen article)
28	Dec 6	Field trip to American Museum of Natural History (?)
29	Dec 8	Review of metamorphism and class in general (bring review questions!)
30	Dec 13	<b>Exam 3</b>

### Grading breakdown

20% Exam 1, 20% Exam 2, 20% Exam 3, 30% Lab, 10% Homework

### Field trips

We have **two Field Trips**. First to the Snake Hill area (9/20), and second to the American Museum of Natural History (TBD, possibly 12/6). We will discuss logistics as each trip approaches. Our goal is for this class to be accessible to all. Please let us know if you have any concerns about either trip.

### Late Work Policy

<i>If your work is...</i>	<i>You will receive...</i>
On time	Full credit
Late	-5% for each late day
Extenuating circumstances?	Talk with teaching staff and we may be able to make arrangements

### Textbook

*Recommended Textbook:*

Winter, John D. *Principles of igneous and metamorphic petrology*. Pearson Education, 2013.

### Policy on collaboration and plagiarism

I encourage students to collaborate during lab and field exercises and to discuss readings, labs, and exercises. However, all homeworks, exams, and written materials turned in for credit must be completed independently unless you have obtained specific permission from me to work as a team.

### Accommodations

Students with qualifying disability accommodation needs should speak with the instructor during the first two weeks of classes to arrange any necessary accommodations.

### COVID

In order to protect the health and well-being of all members of the University community, masks must be worn by all persons on campus when in the presence of others (within six feet) and in buildings in non-private enclosed settings (e.g., common workspaces, workstations, meeting rooms, classrooms, etc.). **Masks must be worn during class meetings; any student not wearing a mask will be asked to leave.**

Masks should conform to CDC guidelines and should completely cover the nose and mouth:

<https://www.cdc.gov/coronavirus/2019-ncov/prevent-getting-sick/about-face-coverings.html>

Each day before you arrive on campus or leave your residence hall, you must complete the brief survey on the My Campus Pass symptom checker self-screening app.

### Student Absences

Health and safety are the priority. If you feel unwell or have reason to believe you may have been exposed to COVID, please do not attend class. Documentation of illness is not required. Please contact the instructors to notify them of the situation.

### Instructor Absences

If the instructor is sick, the first option will be synchronous online instruction. If the instructor is too sick to teach online, alternative learning materials (e.g. recorded lectures or videos) will be made available.