

Petrology of Earth Materials (Lecture & Lab)

CE30540 & CE31540 – SPRING 2020

Instructor: Dr. Antonio Simonetti
Office: 105A Cushing Hall
Tel: 1-6710
Email: simonetti.3@nd.edu
Meeting time: 12:30 pm – 1:45 am T TR, 161 Fitzpatrick
Laboratory hours: 2:00 pm – 4:00 pm Tuesday, 161 Fitzpatrick
Office hours: By appointment
Textbook: Principles of Igneous and Metamorphic Petrology (2nd Edition),
by J.D. Winter. Pearson Prentice Hall, 2010.

TA: Jessika Valenciano (jvalenc2@nd.edu)

Grades:

Homework	20 %
Metamorphic Lab Exam	10 %
Igneous Lab Exam	10 %
Laboratory Assignments	20 %
Metamorphic Petrology M-T Exam	20 %
Igneous Petrology Exam	20 %

Course Description:

Origin and identification of igneous and metamorphic rocks within a plate tectonic framework. Geochemistry and petrography are used to investigate mineral equilibria, magma generation and crystallization, pressure and temperatures of deformation.

Course Website: <http://www3.nd.edu/~asimonet/ENVG20240.html>

LAB Website: <https://www3.nd.edu/~asimonet/CE31540.html>

Course Outline:

METAMORPHIC PETROLOGY – LECTURES

- Chapter 21: Introduction to Metamorphic Petrology
- Chapter 22: Classification of Metamorphic Rocks
- Chapter 23: Structures and Textures of Metamorphic Rocks
- Chapter 24: Mineralogy Assemblages of Metamorphic Rocks
- Chapter 25: Metamorphic Facies
- Chapter 26: Metamorphic Reactions
- Chapter 27: Thermodynamics of Metamorphic Reactions
- Chapter 28: Metamorphism of Pelitic Rocks

IGNEOUS PETROLOGY - LECTURES

Chapter 1: Introduction to Igneous Petrology
Chapter 2: Classification and Nomenclature of Igneous Rocks
Chapter 3: Textures of Igneous Rocks
Chapter 4: Igneous Structures and Field Relationships
Chapters 5, 6 and 7: Thermodynamics and Phase Diagrams
Chapters 8, 9: Chemical Petrology
Chapter 10: Mantle Melting and Generation of Basaltic Magma
Chapter 11: Magma Diversity
Chapter 14: Oceanic Intraplate Volcanism

LABORATORY EXERCISES

Lab-1: 01/15/2019- Review of Optical Microscopy-1
Lab-2: 01/22/2019- Review of Optical Microscopy-2
Lab-3: 01/29/2019- Metamorphic Rocks -1
Lab-4: 02/05/2019- Metamorphic Rocks -2
Lab-5: 02/12/2019- Metamorphic Fabric Development
Lab-6: 02/19/2019- Georgian Metamorphic Belt
Lab-7: 02/26/2019- Review of Metamorphic Rock Labs
Lab-8: 03/05/2019- Metamorphic Rocks Lab Exam

Spring Break – 03/12/2019

Lab-9: 03/19/2019- Getting to Know Igneous Rocks
Lab-10: 03/26/2019- Peridotites: Mantle Samples & Igneous Rocks
Lab-11: 04/02/2019- The Lever Rule
Lab-12: 04/09/2019- Plate Margin Volcanism: Lesser Antilles
Lab-13: 04/16/2019- Hawaii
Lab-14: 04/23/2019- Review of Igneous Rock Labs
Lab-15: 04/30/2019- Igneous Rocks Lab Exam

Course Policies

- Students are expected to attend the lectures on a regular basis.
- Missed exams will not be rescheduled unless arrangements are made in advance with Prof. Simonetti. Rescheduling requires a valid reason, such as a medical condition with a doctor's note.
- Homework and laboratory assignments are to be handed in on time; credit will not be given to assignments submitted late unless alternative arrangements have been arranged with Prof. Simonetti.

Honor Code

The Code of Honor will be strictly applied as described in *The Academic Code of Honor Handbook*. Students will not give or receive aid on exams. This includes, but is not limited to, viewing the exams of others, sharing answers with others, and making unauthorized use of books or notes while taking the exam. For the group project, teams must work completely independently. Relying on solutions from other groups, whether or not they are currently in the course, constitutes plagiarism.

Disabilities

Any student who has a documented disability and is registered with Disability Services should speak with the professor as soon as possible regarding accommodations. Students who are not registered should contact the Office of Disability Services - <http://disabilityservices.nd.edu/>