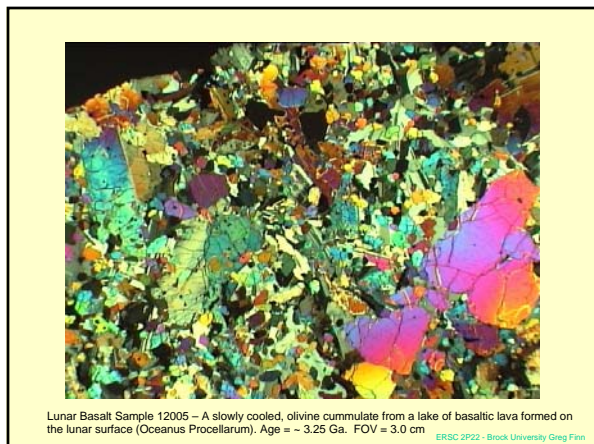


ERSC 2P22 - Optical Mineralogy

Course Description:

- Properties of light and its interaction with mineral grains:
 - reflection, refraction, polarization, interference phenomena, extinction, colour and pleochroism.
- Refractometry; isotropic, uniaxial and biaxial optics; interpretation of interference figures.
- Transmitted light petrography in the identification and familiarization with major rock forming minerals in grain mounts and thin section.

ERSC 2P22 - Brock University Greg Finn



ERSC 2P22 - Brock University Greg Finn

Course Objectives

1. Familiarization with the properties of light and how it interacts with a mineral
2. Use of the petrographic (polarizing) microscope
3. Recognition of:
 - Garnet, halite, fluorite, periclase
 - Quartz, apatite, nepheline, calcite, apatite, tourmaline, zircon
 - Olivine, orthopyroxene, clinopyroxene, amphibole, biotite, muscovite, chlorite, plagioclase feldspar, alkali feldspar
4. **Ability to identify an unknown mineral based on determining its optical properties**

ERSC 2P22 - Brock University Greg Finn

2P22 - Introduction

- Greg Finn
 - 13th Floor, Schmon Tower
 - Greg.Finn@brocku.ca
 - **SEND ME AN E-MAIL FROM THE MAILBOX ADDRESS YOU REGULARLY USE**
- Lectures
 - Monday, Wednesday and Friday
 - 8:00 - 9:00 a.m. in D308
- Laboratory
 - Monday
 - 2:00 - 5:00 in D308

ERSC 2P22 - Brock University Greg Finn

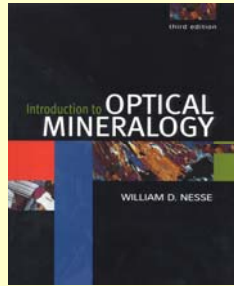
2P22 - WEBSITE

- This course has a home page on the World Wide Web, the URL is:
<http://www.brocku.ca/earthsciences/people/gfinn/optical/2P22.htm>.
- This page contains links to course lecture material as well as copies of overheads used in the lectures. Please let me know if there are problems with these pages
- **PDF files of Lecture PowerPoint slides are available here for downloading.**

ERSC 2P22 - Brock University Greg Finn

2P22 - TEXT

- **Introduction to Optical Mineralogy**, 3rd Edition, by William D. Nesse.
- In the bookstore (\$134.75)
 - This text will be used in this course and all petrology courses offered at Brock. It will serve as a handy reference for use in the real world after graduation.



ERSC 2P22 - Brock University Greg Finn

2P22 – REFERENCE TEXTS

- Available in the Library.
 - Bloss - An Introduction to the Methods of Optical Mineralogy
 - Kerr - Optical Mineralogy
 - Phillips - Mineral Optics, Principles and Techniques
 - Deer, Howie and Zussman - Rock Forming Minerals
 - A 7 volume set, invaluable to petrologists.
 - Deer, Howie and Zussman - Introduction to Rock Forming Minerals
 - A condensed version of the 7 volume set.

ERSC 2P22 - Brock University Greg Finn

2P22 - EVALUATION

- Labs 30%
- Lab Exam 15%
- Spotting Quiz 5%
- Midterm 15%
- Final Exam 35%

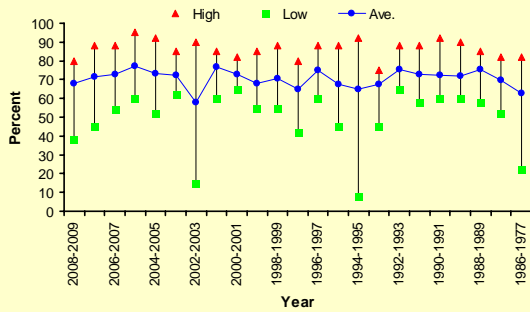
ERSC 2P22 - Brock University Greg Finn

General Course Information

1. 24th time I have offered this course
2. Class size has ranged from 3 to 19
3. Average mark ranges from 63 to 77, highest 95
4. 9 failures

ERSC 2P22 - Brock University Greg Finn

ERSC 2P22 – Final Grades



ERSC 2P22 - Brock University Greg Finn

2P22 - LECTURES

- Properties of light
- Refractometry
 - Relief, Becke Line, RI determination
- Isotropic Materials
 - Optics
- Anisotropic Minerals
 - examination of the various characteristics and properties of anisotropic minerals useful in their identification.

ERSC 2P22 - Brock University Greg Finn

2P22 - LECTURES

- Uniaxial Optics
 - Uniaxial Indicatrix, Interference Figures, Optic Sign determination
- Uniaxial minerals
 - Quartz, apatite, nepheline, calcite, zircon, apatite, tourmaline
- Biaxial Optics
 - Biaxial Indicatrix, Interference Figures, Optic Sign determination
- Biaxial Minerals
 - olivine, pyroxenes (orthopyroxene, clinopyroxene), amphiboles (hornblende, tremolite - actinolite), micas (biotite, muscovite), plagioclase, alkali feldspars.

ERSC 2P22 - Brock University Greg Finn

NO CLASSES

- Friday January 22
- Friday February 5 (TBC)
- Monday February 15 (Family Day)
- Friday April 2 (Good Friday)

ERSC 2P22 - Brock University Greg Finn

2P22 - LABS

- TA – Colin Birnie (colin.birnie@brocku.ca)
- The lab component of this course accounts for 50% of the final grade;
 - 30% for the labs;
 - 5% for spotting quiz
 - 15% for the lab exam.
- **You should be prepared to spend, on average, one additional hour per week, outside the scheduled lab period, working on lab assignments.**

ERSC 2P22 - Brock University Greg Finn

2P22 - LABS

Topics to be covered:

- Mineral Optics
 - petrographic microscope
 - interaction of light with minerals
- Mineral Identification
 - 20 major minerals or mineral groups
- Identification of Unknowns
 - With techniques learned for knowns, you will be able to identify an unknown mineral – lab exam

ERSC 2P22 - Brock University Greg Finn

2P22 – LAB SCHEDULE

- Introduction to the Petrographic Microscope
- Becke Line and Refractive Index Determination
- Double Refraction and Refractive Index
- Uniaxial Minerals - Refractive Index Determination
- Uniaxial Minerals - Interference Figures
- Uniaxial Minerals - Identification, Refractive Index Quiz
- Biaxial Minerals - Optical Properties and Indicatrix
- Biaxial Minerals - Interference Figures
- Pyroxenes - Optical Properties and Identification
- Amphiboles and Micas - Optical Properties and Identification
- Feldspars - Optical Properties and Identification
- Lab Exam - Spotting Quiz and Mineral Identification

ERSC 2P22 - Brock University Greg Finn

2P22 Lab Regulations

- Labs are to be completed individually, i.e. no group work to be submitted
- Microscopes will be assigned in the first lab. Failure to return the microscope key will result in a grade of 35F for the course.
- If you cannot not submit a lab on the due date due to a medical condition, you must complete and submit the Student Medical Certificate, available from:
<http://www.brocku.ca/healthservices/exemption.php>

ERSC 2P22 - Brock University Greg Finn

2P22 Lab Regulations

- Labs are to be submitted directly to the Instructor at the Friday Lecture
- Late labs will be subject to a 20% per day penalty and will not be accepted after 5 days
- Late labs will not be accepted after that lab has been marked and returned

ERSC 2P22 - Brock University Greg Finn

Academic Conduct

- Each student is responsible for their own work
- **Academic misconduct** is deliberate dishonesty and includes, but is not limited to, the following forms:
 - Impersonation of a candidate in an exam or test.
 - Copying a laboratory report, or allowing someone else to copy one's report
 - Allowing someone else to do the laboratory work.
- **Plagiarism** means presenting work done (in whole or in part) by someone else as if it were one's own. Associate dishonest practices include faking or falsification of data, cheating, or the uttering of false statements by a student in order to obtain unjustified concessions (FHB, III 15.1)
- It is your responsibility to understand what constitutes academic misconduct. For information on the various kinds of academic dishonesty please refer to the current Brock University Undergraduate Calendar. (<http://www.brocku.ca/webcal/current/undergrad/areg.html#sec17>)

ERSC 2P22 - Brock University Greg Finn
