

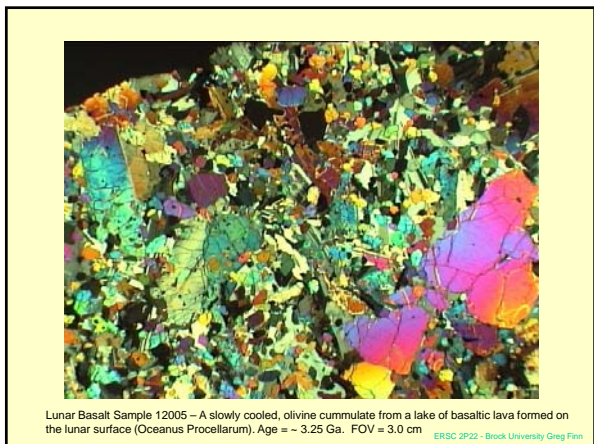


ERSC 2P22 - Optical Mineralogy

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.

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Lunar Basalt Sample 12005 - A slowly cooled, olivine cummulate from a lake of basaltic lava formed on the lunar surface (Oceanus Procellarum). Age = - 3.25 Ga. FOV = 3.0 cm 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, sylvite, fluorite, periclase
 - Quartz, apatite, nepheline, calcite, 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**

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2P22 - Introduction

- Greg Finn
 - 13th Floor, Schmon Tower
 - Greg.Finn@brocku.ca
 - **SEND ME AN E-MAIL FROM THE ACCOUNT YOU REGULARLY USE**
- Lectures
 - Monday, Wednesday and Friday
 - 8:00 - 9:00 a.m. in D319
- Laboratory
 - Monday
 - 2:00 - 5:00 p.m. in D308

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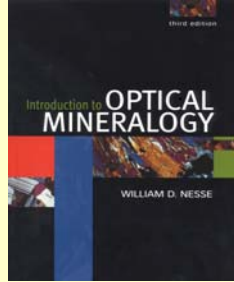
2P22 - WEBSITE

- This course has a home page on the World Wide Web, the URL is: <http://www.brocku.ca/mathematics-science/departments-and-centres/earth-sciences/people/gregory-c-finn/optical-mineralogy>.
- 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.**

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2P22 - TEXT

- **Introduction to Optical Mineralogy**, 3rd or 4th Edition, by William D. Nesse.
- Availability
 - 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.
 - (M-L Chart)



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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 12 volume set, invaluable to petrologists.
 - **Deer, Howie and Zussman** - Introduction to Rock Forming Minerals
 - A condensed version of the above set.

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Evaluation

- Labs (10) 30%
- Lab Exam 15%
 - Open Book, Lab 12 March 28, 2016
- Spotting Quiz 5%
 - In Lab 7, February 22, 2016
- Midterm 15%
 - Date February 10, 2016 in the lecture
- Final 35%
 - Date TBC

Students are expected to attend lectures and labs and must submit all labs in order to pass this course.

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Academic Integrity

- Because academic integrity is important to the well-being of the academic community, Brock University takes academic misconduct very seriously. Academic misconduct includes plagiarism, which involves presenting the words and ideas of another person as if they were your own, and other forms of cheating such as copying answers or using crib notes during a test.
- The penalties for academic misconduct can be very severe. A grade of 0 may be given on the assignment or on the course, and a second offence may result in suspension from the University.
- Students are urged to read the section of the Brock University calendar that pertains to academic misconduct.

(See: <http://www.brocku.ca/webcal/2013/undergrad/areg.html#sec68>)

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Academic Accommodation I

- As part of Brock University's commitment to a respectful work and learning environment, the University will make every reasonable effort to accommodate all members of the university community with disabilities.
- If you require academic accommodations related to a documented disability to participate in this course, you are encouraged to contact Services for Students with Disabilities in the Student Development Centre (4th floor Schmon Tower, ex. 3240).
- You are also encouraged to discuss any accommodations with the instructor well in advance of due dates and scheduled assessments.

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Academic Accommodation II

- Brock University acknowledges the pluralistic nature of the undergraduate and graduate communities such that accommodations will be made for students who, by reason of religious obligation, must miss an examination, test, assignment deadline, laboratory or other compulsory academic event.
- Students requesting academic accommodation on the basis of religious obligation should make a formal, written request to their instructor(s) for alternative dates and/or means of satisfying requirements.

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Medical Exemption Policy

- The University requires that a student be medically examined in Health Services, or by an off-campus physician prior to an absence due to medical reasons from an exam, lab, test, quiz, seminar, assignment, etc.
- Student Health Services will provide medical documentation only if:
 - Medically warranted (i.e., a simple cold is not medically warranted).
 - The student presents him/herself to Health Services before the exam.
 - The student is seen in the office the day of the exam, lab, etc.
- If your medical condition requires special consideration for academic activity (e.g., missed seminars or labs, assignment extensions, or examination/test rescheduling) and is on a day or at a time when Health Services is not open, then you must go to another medical facility to obtain the necessary written medical documentation, which is the completion of Brock University's Medical Certificate."
- The Medical Certificate can be found at
- <http://www.brocku.ca/health-services/policies/exemption>

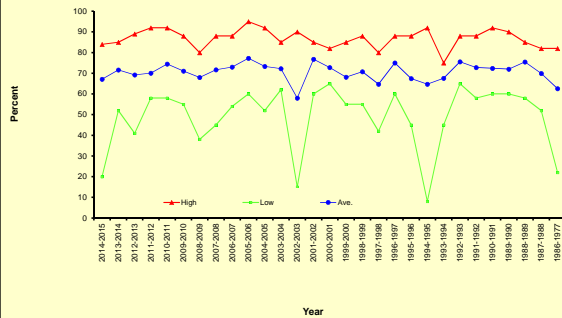
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General Course Information

1. 30th 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. 10 failures

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ERSC 2P22 - Final Grades



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.

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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.

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NO CLASSES

- Monday February 1, 2016
 - LAB WILL RUN ON THIS DAY
- Monday February 29, 2016
 - LAB WILL RUN ON THIS DAY
- Monday March 14, 2016
 - LAB WILL RUN ON THIS DAY

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2P22 - LABS

- TA – Mukudzei Dube
 - Email address - TBC
- 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.**

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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 – Open Book Lab Exam

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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 (open book)

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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 submit a lab on the due date due to a medical condition, you must complete and submit the Student Medical Certificate

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2P22 Lab Regulations

- Labs are to be submitted directly to me at the end of the Wednesday 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

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