# ESS 103 Minerals and Gems

**Autumn Quarter 2012**

Tuesdays and Thursdays 1:30–2:20
Room 075 Johnson Hall

**Instructor:** Mike Harrell
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**Textbooks:** The required texts are the *National Audubon Society Field Guide to North American Rocks and Minerals* by C.W. Chesterman (C), *Minerals of the World* by O. Johnsen (J), and *Gemstones of the World, Third* **or** *Fourth Edition* by W. Schumann (S).

**Course Content:** The lectures will begin with an introduction to the nature of minerals: their composition, structure, physical properties, and origins, with emphasis on the gem minerals. Subsequent lectures will proceed systematically through the minerals on the basis of composition and structure, and will address topics of particular interest in gemology, such as the mechanisms of color, history and lore of gems, and the conventional and unconventional uses of gems.

**Laboratory:** The weekly laboratory sessions in 117 Johnson Hall are essential to the course, in that they present opportunities to examine, characterize, and gain insight into representative gem and mineral specimens. A separate syllabus for the laboratories will be distributed during the first lab session. Please attend only the section for which you are registered; if you must miss your section at some point, seek the permission of the TA *in advance* in order to attend another section. Laboratories will include in-class exercises and one self-guided field trip.

**Readings:** Topics will be assigned from the textbooks as listed on the reverse of this sheet. It will typically prove advantageous to complete each reading before that week's laboratory session.

**Examinations:** The mid-term examination (30 October) will cover material from the lectures, reading, and laboratory exercises. The final examination (14 December) will emphasize material from the second half of the course and will be of approximately the same length as the mid-term.

**Grading:** laboratory 60%, mid-term 20%, final 20%. The standard UW grading scale will be employed: faculty.washington.edu/scstroup/Gradescale.html

| Week | Dates | Topics | Readings |
|---|---|---|---|
| 1 | 25-27 Sept | introduction, definitions, crystal structures | C: 13-48, J: 11-45<br>S: 10-30 |
| 2 | 2-4 Oct | physical properties, optical properties | C: none, J: 46-73<br>S: 31-57 |
| 3 | 9-11 Oct | gem cutting, mineral environments | C: 759-781, J: none<br>S: 61-81, 96-97 |
| 4 | 16-18 Oct | native elements: *diamond, gold* | C: 281-283, 343-356<br>J: 75-92<br>S: 86-95 |
| 5 | 23-25 Oct | oxides, sulfates, sulfides, carbonates, phosphates: *ruby, sapphire, chrysoberyl, spinel, rhodochrosite, turquoise* | C: 357-382, 393-445, 453-457<br>J: 93-248<br>S: 98-105, 114-117, 184-193 |
| 6 | 30 Oct - 1 Nov | **Tuesday: mid-term examination**<br>introduction to silicates | C: none, J: none<br>S: none |
| 7 | 6-8 Nov | neso-, soro-, and cyclosilicates: *peridot, topaz, garnet, zircon, beryl, emerald, aquamarine, tourmaline* | C: 501, 558-590<br>J: 249-297<br>S: 106-113, 118-129, 174-175 |
| 8 | 13-15 Nov | ino-, phyllo-, and tectosilicates: *jade, serpentine, quartz* | C: 502-557, J: 298-394<br>S: 170-173, 132-165, 218-219 |
| 9 | 20 Nov | conclusion of silicates | C: none, J: none<br>S: none |
| | 22 Nov | **Thanksgiving Holiday** | |
| 10 | 27-29 Nov | non-mineral gems: *pearl, coral, ivory, amber, opal; imitations, synthetics, composites* | C: 690-691<br>J: 395-396<br>S: 166-169, 244-275 |
| 11 | 4-6 Dec | conclusion of non-mineral gems | C: none, J: none<br>S: none |

**Final Examination:** 2:30-4:20 pm, Friday, 14 December, Room 075 Johnson Hall

**Alternate Final Examination:** 7:00-9:00 pm, Tuesday, 11 December, Room 102 Johnson Hall

Note: Lecture topics and readings are subject to change.