**G121: METEORITES AND PLANETS**  
Course Outline and Logistics for Spring, 2009

Principal Text:
McSween: Meteorites and Their Parent Planets (2nd Ed. 1999)

Recommended:
Adams: Moon, Mars and Meteorites (U.S. ed., 1986)

Additional assignments from:
2. Grotzinger and others: Understanding Earth (2006; 5th Ed)
3. Feynman: Surely You're Joking, Mr. Feynman (Bantam ed., 1986)

*These are on reserve in the Geology Library. IU Bookstore sells a course-pack of the additional reading*

“STUDY” means a lot more than a quick cursory reading

**LECTURE SCHEDULE AND STUDY ASSIGNMENTS**

1. Jan 12 Introduction; course outline; "what, where, when, how, & why" in science and in this course; faces of planetary bodies; minerals, rocks, fossils.  
   *Study: McSween: Pages 1-14; 279-280. Feynman: Pages 191-198 (MUST)*

2. Jan 14 Impact cratering: some terms; diverse scales, multi-ringed basins, calderas.  
   *Study: McSween: p. 15-36; Hartmann: p. 249-257*

   **QUIZ**

 Monday January 19 – Martin Luther King Day NO CLASS

   *Study: Hartmann: p. 257-261; Wear colorful clothes on Wednesday Jan 28 QUIZ*

4. Jan 26 Relative ages, crater counts; ages of planetary surfaces.  
   *Study: Hartmann: p. 249-261 Wear colorful clothes on Wednesday Jan 28*

5. Jan 28 Remote sensing; reflectance spectra; asteroids, moons and planets. **QUIZ**
   *TODAY: Wear colorful clothes today.*
   *Study: McSween: p. 91-94, fig 3.12; 162-167; 222-226.*

6. Feb 2 Minerals and their atomic structures.  
   *Study: Grotzinger & others: p. 45-54.*

7. Feb 4 Properties of meteorites and basic classification. **QUIZ**
   *Study: McSween: p. 7-14*

8. Feb 9 Chondrites - age; chemistry; texture.  
   *Study: McSween: p. 40-67*


10. Feb 16 Achondrites - planetary heating; fractional crystallization of silicate melts.  
    *Study: McSween: p. 118-123; Grotzinger & others: p. 78-87.*

   **W Feb 18 EXAMINATION I**
11. Feb 23  Achondrites - planetary heating; fractional crystallization of silicate melts.  
   **Study:** McSween: p. 118-123; Grozinger & others: p. 78-87.
12. Feb 25  Achondrites - differentiated bodies. **QUIZ**  
   **Study:** McSween: p. 126-136; 205-206
13. Mar 2  Rocks from differentiated bodies; spectral reflectance of Vesta.  
   **Study:** McSween: p. 162-167
14. Mar 4  Geology of Mars. **QUIZ**  
   **Study:** McSween: p. 176-181; and, consult any recent book in the Geology Library.

**Spring Break (Mar 8 – Mar 15)**

15. Mar 16  Rocks of the Earth, Moon, Mercury, Venus, and Mars.  
   **Do not cut class; take good notes**

W  Mar 18  **EXAMINATION II**
16. Mar 23  Cooling rates, planet size, and internal processes of terrestrial planetary bodies.  
   **Study:** McSween: p. 103-109, 173-176.
17. Mar 25  Planet Earth - seismic activity; equations for P & S waves; density and rigidity of interiors of planets. **QUIZ**  
   **Study:** Grozinger & others: p. 301-303; 326-330.
18. Mar 30  Planet Earth - core dynamo; magnetosphere; rock magnetism.  
   **Study:** Grozinger & others: p. 337; 342-344; also fig. 2.10
19. Apr 1  Planet Earth - plate tectonics. **QUIZ**  
   **Study:** Grozinger & others: p. 23-42; esp. fig. 2.6
20. Apr 6  Mercury, Venus, Earth, Mars Revisited  
W  Apr 8  **EXAMINATION III**
   **Study:** McSween: p. 73-74, 275-279; Grozinger & others: 254-257
22. Apr 15  Evolution of life on Earth **QUIZ**  
   **Study:** TBD
23. Apr 20  Atmosphere, ocean, land and life on Earth **QUIZ**  
   **Study:** TBD
24. Apr 22  Life on Mars - the debate through the centuries.  
   **Study:** Grozinger & others: 265-267.  
   [http://cass.jsc.nasa.gov/lpi/meteorites/mars_meteorite.html](http://cass.jsc.nasa.gov/lpi/meteorites/mars_meteorite.html)  
   [http://www.soest.hawaii.edu/PSRdiscoveries/](http://www.soest.hawaii.edu/PSRdiscoveries/)  
25. Apr 27  Mass extinctions on Earth **QUIZ**  
   **Study:** Grozinger & others: 261-263.
26. Apr 29  Review  

**FINAL EXAMINATION: 7:15 –9:15 p.m. Monday May 4 (This Room)**
EXAMINATIONS AND GRADING

Grading will be on an "A-F" scale; "S-F" will not be permitted and an "I" will be allowed only for medical reasons and extremely extenuating circumstances.

We will have an OPEN BOOK OPEN NOTES as in the schedule. The quizzes will add up to 20% of the course grade. We will drop the two lowest quiz grades including absences. Three intra-term comprehensive OPEN BOOK OPEN NOTES examinations, each worth 20% of the course grade (i.e., 60% for three), will be given during the semester. The FINAL lecture examination, also OPEN BOOK OPEN NOTES, will also be comprehensive and will constitute 20% of the course grade. Students are strongly encouraged to participate in discussions and submit optional homework; marginal adjustment of letter grades may be made depending on contribution to class discussions and homework. MATERIAL DISCUSSED IN THE CLASS, WHETHER IN THE READING ASSIGNMENT OR NOT, WILL BE IN THE QUIZZES AND EXAMINATIONS.

Attendance is YOUR responsibility; we discuss contemporary topics in solar system exploration that are NOT in the reading assignment. Extra material within the pages of reading assignment will not be in the examinations. Take good notes.

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