G121: METEORITES AND PLANETS

Course Outline and Logistics for Fall 2013
ATTENDANCE IS YOUR RESPONSIBILITY (as an adult in college)

Class 3070 01:00 - 02:15 p.m. MW GY 126

G121 Meteorites and Geological Processes in Planets (3 cr.) CASE N&M GenEd Geological processes operative on earth-like planetary bodies and asteroids; evidence from current meteorite, lunar, martian, and space research; quantitative and deductive exercises. For non-science majors. Credit given for only one of G121 and S121.

NOTE: All tests are open book, open notes. Laptops, iPads and equivalent devices are allowed for taking notes, quizzes and examinations but not for communication during class hours.

IMPORTANT: We are trying hard to schedule an Alternate Final earlier in the Finals Week, but we are dependent on the Registrar’s Office to release a class-room for two hours.

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

Additional assignments from:
1. Feynman: Surely You’re Joking, Mr. Feynman (Bantam ed., 1986)
2. Grotzinger and Jordan: Understanding Earth (2010; 6th Ed)

These are on reserve in the Geology Library. IU Publishing will have a course-pack with the relevant pages from these assignments.

LECTURE SCHEDULE AND STUDY ASSIGNMENTS

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

1. M Aug 26 Introduction; course outline; "what, where, when, how, & why" in science and in this course; faces of planetary bodies; minerals, rocks, fossils.
2. W Aug 28 Impact cratering: some terms; diverse scales, multi-ringed basins, calderas.
   Study: McSween: p. 15-36; Hartmann: p. 249-257 QUIZ

M Sep 2 Labor Day Class Does Not Meet

3. W Sep 4 Impact cratering: energy considerations; crater degradation. QUIZ
Study: Hartmann: p. 257-261; **Wear colorful clothes on Wednesday Sep 11**

4. M Sep 9  Relative ages, crater counts; ages of planetary surfaces.
   - **Study:** Hartmann: p. 249-261 **Wear colorful clothes on Wednesday Sep 11**

5. W Sep 11  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.

   - **Study:** Grotzinger & Jordan: p. 56; 63-65.

7. W Sep 18  Properties of meteorites and basic classification. **QUIZ**
   - **Study:** McSween: p. 7-14

8. M Sep 23  Chondrites - age; chemistry; texture.
   - **Study:** McSween: p. 40-67

**W SEP 25  EXAMINATION I**

   - **Study:** McSween: p. 51-67.

10. W Oct 2  Achondrites - planetary heating; fractional crystallization of silicate melts. **QUIZ**
    - **Study:** McSween: p. 118-123; Plummer, Carlson and McGeary: p. 60-74.

11. M Oct 7  Achondrites - planetary heating; fractional crystallization of silicate melts.
    - **Study:** McSween: p. 118-123; Plummer, Carlson and McGeary: p. 60-74

12. W Oct 9  Achondrites - differentiated bodies. **QUIZ**
    - **Study:** McSween: p. 126-136; 205-206

    - **Study:** McSween: p. 162-167

    - **Study:** McSween: p. 176-181; and, consult any recent book in the Geology Library.

    - **Do not cut class; take good notes**

**W Oct 23  EXAMINATION II**

    - **Study:** McSween: p. 103-109, 173-176.

17. W Oct 30  Planet Earth - seismic activity; equations for P & S waves; density and rigidity of interiors of planets. **QUIZ**
    - **Study:** Grotzinger & Jordan: p. 344-346; 370-372; 374; 376-377.

18. M Nov 4  Planet Earth - core dynamo; magnetosphere; rock magnetism.
    - **Study:** Grotzinger & Jordan: p. 383; 388-389.

19. W Nov 6  Planet Earth - plate tectonics. **QUIZ**
    - **Study:** Grotzinger & Jordan: p. 29-39; esp. fig. 2.8

    - **Do not cut class; take good notes**

21. W Nov 13 Genetic classification of meteorite parent bodies. **QUIZ**
    - **Study:** McSween: p. 103-109, 173-176.

    - **Study:** McSween: p. 73-74, 275-279; Dott and Prothero: p.196-198.

**W Nov 20  EXAMINATION III**

**THANKSGIVING BREAK – Our class will NOT meet on Mon Nov 25 & Wed Nov 27**

23. M Dec 2  Life on Mars - the debate through the centuries.
    - **Study:** Grotzinger & Jordan: 300-302.
http://cass.jsc.nasa.gov/lpi/meteorites/mars_meteorite.html
http://www.soest.hawaii.edu/PSRdiscoveries/
http://www.psrd.hawaii.edu/Oct96/LifeonMars.html/

24. W Dec 4  Evolution of life on Earth **QUIZ**  
    Study: Dott and Prothero: p. 43; 48-64.  

25. M Dec 9  Mass extinctions on Earth  

26. W Dec 11  Review; Optional Quiz

**FINAL EXAMINATION: 5:00 pm – 7:00 pm Friday Dec 20 (This Room)**  
**IMPORTANT:** We are trying hard to schedule an Alternate Final earlier in the Finals Week, but we are dependent on the Registrar’s Office to release a class-room for two hours.

**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 OPEN BOOK OPEN NOTES quizzes and examinations as in the schedule. The quizzes will add up to **20%** of the course grade, for which we will use the best 8 scores. We will drop the scores of the rest of the quizzes; the drops will include all **absence that will be assigned a score of 0 (zero)** regardless of illness or late-add. 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, 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 (no guarantee). **MATERIAL DISCUSSED IN THE CLASS, WHETHER IN THE READING ASSIGNMENT OR NOT, WILL BE IN THE QUIZZES AND EXAMINATIONS.**

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**OTHER INSTRUCTIONS and EXPECTATIONS**

**ON THE FIRST DAY OF CLASS:**
1. Fill out address slips  
2. Form study groups  
3. See Basu if you have serious problems with quiz dates.

**ATTENDANCE** is your responsibility; we discuss contemporary topics and discoveries in **solar system exploration** that are **NOT** in the reading assignment. Except for Feynman, material within the pages of reading assignment but not discussed in class will not be in the examinations.
REQUIRED: Clipboard binder to keep all handouts that you print from Oncourse Resources. Bring all handouts and notes to every class meeting. STUDY (≠ read) notes in advance of class time; we will combine the traditional lecture-format with a discussion-format.

NOTE TAKING:
You will have lecture outlines and some facts for every class through ONCOURSE. Please print the day’s lecture outlines (or save in a laptop) and bring to class to take notes. Put the hardcopies in a three-ring binder in sequential order for review before quizzes and to assist in writing papers. You may use a laptop or a similar e-device to take and retain notes, but NOT for communication through the internet, e-mail, text-messaging etc. Printed handouts will NOT be distributed after this first class.

Take good notes: You must write down whatever is written or drawn on the chalkboard; use the handouts to take notes in the class; rewrite notes as soon as possible after class. See me during office hours to check the ‘goodness’ of your notes.

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