G121: METEORITES AND PLANETS
Course Outline and Logistics for Spring, 2014

Class 25403  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.

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
STUDY the reading assignments before coming to class and participate

1. M Jan 13  Introduction; course outline; "what, where, when, how, & why" in science and in this course; faces of planetary bodies; minerals, rocks, fossils.
2. W Jan 15  Impact cratering: some terms; diverse scales, multi-ringed basins, calderas.
   Study: McSween: p. 15-36; Hartmann: p. 249-257 QUIZ

M Jan 20 MLK Birthday Class Does Not Meet

3. W Jan 22  Impact cratering: energy considerations; crater degradation. QUIZ
   Study: Hartmann: p. 257-261; Wear colorful clothes on Wednesday Jan 29
4. M Jan 27  Relative ages, crater counts; ages of planetary surfaces.
   Study: Hartmann: p. 249-261 Wear colorful clothes on Wednesday Jan 29
5. W Jan 29  Remote sensing; reflectance spectra; asteroids, moons and planets. QUIZ
   TODAY: Wear colorful clothes today.
   Study: Grotzinger & Jordan: p. 56; 63-65.
7. W Feb 5 Properties of meteorites and basic classification. QUIZ
   Study: McSween: p. 7-14
8. M Feb 10 Chondrites - age; chemistry; texture.
   Study: McSween: p. 40-67
W FEB 12 EXAMINATION I
10. W Feb 19 Achondrites - planetary heating; fractional crystallization of silicate melts. QUIZ
11. M Feb 24 Achondrites - planetary heating; fractional crystallization of silicate melts.
    Study: McSween: p. 118-123; Plummer, Carlson and McGeary: p. 60-74
12. W Feb 26 Achondrites - differentiated bodies. QUIZ
    Study: McSween: p. 126-136; 205-206
13. M Mar 3 Rocks from differentiated bodies; spectral reflectance of Vesta.
    Study: McSween: p. 162-167
14. W Mar 5 Geology of Mars. QUIZ
    Study: McSween: p. 176-181; and, consult any recent book in the Geology Library.
    Do not cut class; take good notes
W Mar 12 EXAMINATION II

SPRING BREAK – Our class will NOT meet on Mon Mar 17 & Wed Mar 19

17. W Mar 26 Planet Earth - seismic activity; equations for P & S waves; density and rigidity of interiors of planets. QUIZ
18. M Mar 31 Planet Earth - core dynamo; magnetosphere; rock magnetism.
19. W Apr 2 Planet Earth - plate tectonics. QUIZ
    Study: Grotzinger & Jordan: p. 29-39; esp. fig. 2.8
20. M Apr 7 Mercury, Venus, Earth, Mars Revisited.
    Do not cut class; take good notes
21. W Apr 9 Genetic classification of meteorite parent bodies. QUIZ
W Apr 16 EXAMINATION III
23. M Apr 21 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.psrdiscovery.hawaii.edu/Oct96/LifeonMars.html/
24. W Apr 23 Evolution of life on Earth QUIZ
    Study: Dott and Prothero: p. 43; 48-64.

25. M Apr 28  Mass extinctions on Earth

26. W Apr 30  Review; Optional Quiz

   FINAL EXAMINATION: 12:30 pm – 2:30 pm Wednesday May 7 (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 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 assignments. Except for Feynman, material within the pages of reading assignment but not discussed in class will not be in the examinations.

It is assumed that you will pay attention in class and take notes for study at home.

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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