

Astronomy C1403
Extra Credit Options
Due December 6, 2007
Prof. Arlin Crotts

These are suggestions for extra credit projects, along with the maximum percentage point which would be added to the final course grade once it is computed and the grade curve constructed.

Option 1 (5 points)

How important are tidal forces in influencing the structure of the Solar System's moons? Calculate the Roche limit for the major planets with natural satellites, and compare these to the locations of the actual moons, as well as their size, density and shape.

Option 2 (10 points)

The work of Ansel Adams (1902-1984) is perhaps the most acclaimed and best known of American nature photography. One of his best known works is "Moon and Half Dome" (Yosemite National Park, California, 1960). Using information on the World Wide Web and Voyager StarGazer software that comes on the CD-ROM with your textbook, discover exactly when and where Adams took this photograph. A goal of this exercise is to gain some insight into the preparation Adams made in creating this image. This requires some use of geometry and trigonometry, with which Professor Crotts can help.

Option 3 (15 percent)

We have spoken of three independent types of environmental stress that humankind imposes on Earth's atmosphere on a large scale. Pick one of them to discuss, with the goal of describing how the problem arises, how serious it is at present, and predictions of how it may evolve in the future. Discuss the certainty with which we know and do not know these things, and the evidence it is based on. Please try to write a treatment that is objective (non-ideological) as possible.

- 1) Global dimming: extensive decrease in sunlight due to air pollution
- 2) Ozone depletion: chlorofluorocarbon O₃ destruction; increased UV
- 3) Global warming: greenhouse effect's many impacts. Concentrate on one of:
 - a) Sea Level Rise: describe this both in terms of ice melt and thermal expansion of the ocean
 - b) Stress on Ecosystems: distinguish between polar versus equatorial versus temperate zones, and aquatic versus land versus marginal environments
 - c) Changes in precipitation: discuss this in terms of global versus local changes and predictions

Option 4 : suggest your own project, subject to negotiation with Professor Crotts.