

ASTRONOMY 232G : Sun, Earth and Planets

WINTER 2007

General Information:

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| Lectures | Tuesday & Thursday from 11.30am to 12.30pm, Kresge Building K203 |
| Instructor | Els Peeters Room 213 P&A; phone: 661-2111 extension 80973; e-mail : epeeters-at-uwo.ca |
| Course Website | http://astro.uwo.ca/~epeeters/courses/a232g ; userid=a232g; password=planet |
| Course e-mail | a232g-at-astro.uwo.ca |
| Office Hours | By appointment (email preferred) or drop by my office |
| Textbook | “An introduction to the solar system” by P.A. Bland, N. McBride, E.A. Moore, M. Widdowson and I. Wright, eds. N. McBride and I. Gilmour, 1 st co-published edition 2004. Available in the UWO bookstore. |

Course Description:

The course is intended to offer a detailed survey of what is presently known about the solar system and its constituents. We will cover the following topics :

1. A tour of the solar system
2. The internal structure of the terrestrial planets
3. Planetary volcanism
4. Planetary surface processes
5. Atmospheres of terrestrial planets
6. The giant planets
7. Minor bodies in the solar system
8. The origin of the solar system
9. Meteorites: a record of formation

Some of the course material will be descriptive. This is partly because a descriptive knowledge of what is known is a necessary background for understanding how objects in the solar system have formed and changed. It is also partly because much of this material is in itself quite interesting; it is hard to imagine here on earth the variety of bodies found orbiting our sun. However, you should always focus your attention particularly on the aspects of the material that require understanding, and resist the temptation to memorize large amounts of insignificant factual material. An important objective of the course is to gain skill at reading critically the scientific literature at the level of Scientific American.

Prerequisite:

1.0 university course in Mathematics, Chemistry, Computer Science, Earth Sciences or Physics. Unless you have either the prerequisites for this course or written special permission from your Dean to enroll in it, you may be removed from this course and it will be deleted from your record. This decision may not be appealed. You will receive no adjustment to your fees in the event that you are dropped from a course for failing to have the necessary prerequisites.

Lectures Slides:

Much of the material provided in the lectures will be posted on the course website for ease of future reference. You will still be expected to take notes during the class which will cover the numerous discussion topics/informational tidbits not found in the formal class presentations.

Other Reference Material:

Most of the material that you will require can be gleaned from the course notes and the text. All introductory Astronomy books (of which there are a number in the library) have sections of varying quality on the Solar System. Some internet resources can be useful, but much information may be dated or incorrect; be very cautious in using any internet-based information in conjunction with this course. A few books dealing specifically with various aspects of the Solar System are:

- The New Solar System, A. Chaikin, C. C. Peterson & J. K. Beatty, 1999. C.U.P, New York : many attractive pictures; the book covers our course at a more elementary level.

- Moons and Planets, W.K. Hartmann, 1999. Wadsworth : a fairly comprehensive and detailed text at about the level of the course.

- Exploring the Planets, E. H. Christiansen & W. K. Hamblin, 1995. Simon & Schuster : mainly about planetary surfaces. Many excellent black-and-white photos.

- Atmospheres, R.M. Goody & J.C.G. Walker, 1972. Prentice-Hall : a short introduction to physics of planetary atmospheres. Very clear.

- Encyclopedia of the Solar System , P.R. Weissman, L-A.McFadden & T. V. Johnson, 1999. Academic Press : an up-to-date extensive reference guide with many illustrations. Some (but not all) of the chapters are at a level appropriate for our course.

- Planetary Sciences, I. de Pater 2001. Cambridge University Press : an advanced text which covers all the material in our course in a completely up-to-date treatment.

Evaluation:

The course will contain two assignments, a mid term exam and a final exam worth respectively 15%, 20%, 20% and 45% of your final mark. The mid-term exam will be on March 6, 2007 during class hours and will last for 50 minutes. The final examination will last for three hours and covers all course material. Exams consist of multiple-choice and, short-answer questions as well as essay questions. **No** electronic devices will be allowed during the exams. The two assignments are essays and are due on Jan. 30, 2006 and March 29, 2006. Hence, the following dates are important :

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| Jan. 9 | start of course | |
| Jan. 30 | 1st assignment due (2pm) | 15% |
| March 6 | mid-term exam | 20% |
| March 29 | 2nd assignment due (2pm) | 20% |
| April 12 | end of course | |
| April | final exam | 45% |

Late Policy:

Essays are due at 2pm on the due date. They may either be handed in to me during class or slid under my door (room 213). A late penalty of 10% per workday is assessed on all material handed in late. I do not accept work more than one week (five workdays) late - an automatic mark of 0% for the assignment or essay will be given for work handed in more than one week late.

Critical Assessment of Scientific Articles:

In reading (or writing an essay about) the type of scientific arguments encountered in this course you should bear in mind the following points.

Usually your reading will include one or more theories which have been proposed to account for physical phenomena which are observed (or believed to exist).

- How accurately known, or how well observed is the phenomenon to be explained? It is pointless providing an incredibly accurate explanation for something that is only rather poorly quantified.
- What assumptions have gone into the theory? What effect do you think that these assumptions will have? How have the authors proposed to test their theory?
- All evidence that has a bearing on the subject is relevant. How important is each piece of evidence? Is a particular fact crucial or rather peripheral?
- Is contradictory evidence discussed clearly? Are the contradictory facts a serious problem, or is it likely that they appear to be contradictory because of the assumptions made in the explanation and could, perhaps, be explained by a more detailed investigation?
- Do the authors make a consistent argument or are there gaps left in their argument? There may well be gaps - are they honest about them and do they discuss them?
- Form your own critical opinion on the subject. Don't assume that the viewpoint of the article is correct just because it is in print or because the authors say that it is the only plausible explanation.

General Instructions for Writing Essays:

- Think carefully about the organization of your essay. Make sure the order of presentation and logic are clear. Good organization is one of the most important features of a good essay, and I consider this aspect quite seriously in marking. Having a good, detailed outline before you start writing makes the actual job of writing much easier.
- Write clearly, carefully, and succinctly and then check your paper for grammatical and spelling errors. Your model for style should be Scientific American articles, not the informal language that many people use with their friends.
- Do not use any direct scientific quotations in the body of your essay. It should be written entirely in your own words. (The reason for this rule is to discourage you from letting the original article do your work for you - I want to see your writing, not someone else's.) Unacknowledged quotations are plagiarism, and will lead to a mark of 0.
- I expect all essays to be typed using a word processor. You may include illustrations if you wish, but this is not necessary. Include a bibliography of all the articles that contributed significantly to your essay.
- You may make use of the internet as a secondary means of researching your topic but do not rely on any internet information as a primary source for your essays. In particular, do not cut and paste material from websites into the text of your essay. Use your own words to summarize important points.
- **All essays must be submitted in both hardcopy and electronic form.** The University of Western Ontario uses software for plagiarism checking. Students are required to submit their written work in electronic form for plagiarism checking.

Academic Offenses:

Students must write their essays and assignments in their own words. Whenever students take an idea, or a passage from another author, they must acknowledge their debt both by using quotation marks where

appropriate and by proper referencing such as footnotes or citations. Plagiarism is a major academic offense.

Scholastic offenses are taken seriously and students are directed to read the appropriate policy, specifically, the definition of what constitutes a Scholastic Offense, at the following website :
<http://www.uwo.ca/univsec/handbook/appeals/scholoff.pdf>.

All required papers may be subject to submission for textual similarity review to the commercial plagiarism detection software under license to the University for the detection of plagiarism. All papers submitted for such checking will be included as source documents in the reference database for the purpose of detecting plagiarism of papers subsequently submitted to the system. Use of the service is subject to the licensing agreement, currently between The University of Western Ontario and Turnitin.com (<http://www.turnitin.com>).

Computer-marked multiple-choice exams may be subject to submission for similarity review by software that will check for unusual coincidences in answer patterns that may indicate cheating.