Astronomy 111: the solar system and its origin

Fall 2011

In Astronomy 111 we will become familiar with the tools, methods and concepts of astronomy, and begin study of the observational basis for understanding the solar system. One way to describe the level of the course is to say that we will go as far as single-variable calculus, classical mechanics, Newton's law of gravity, and the ideal-gas law will take us. We will discuss the structure and composition of the individual planets and many smaller solar-system bodies, as well as the orbital dynamics and overall structure of the solar system. Astronomy 111 has no formal prerequisites, but the course is intended for science majors who have had beginning calculus or are taking it concurrently. We will thus use mathematical formulations of physics to describe planetary phenomena.

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Teaching assistants
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Textbooks: Only one book is required: Guy J. Consolmagno and Martha Schaefer, Worlds Apart. Other books that may be found useful, but which you needn’t buy, are by Frank H. Shu, The Physical Universe, and by William K. Hartmann, Moons and Planets. All of these books are on reserve in the Physics-Optics-Astronomy (POA) Library, 374 Bausch and Lomb Hall.

World Wide Web site: http://www.pas.rochester.edu/~dmw/ast111. In these pages one can find the course outline, lab manual, exam solutions, practice examinations, links to other Web sites, and many other useful resources, even a copy of this document.

Lectures: Tuesdays and Thursdays, 11:05-12:20 PM, in 2-110E Dewey Hall, conducted by Dan Watson. All students are expected to attend all of the lectures. Complete electronic copies of each lecture presentation can be found on our Web site, the day before the lecture is given, and can be downloaded and printed in a format that’s handy for taking additional lecture notes.

Recitations/Workshops: Thursdays 6:15-8:55 PM or Fridays 2-4:40 PM, in 203H Bausch and Lomb Hall, conducted by the TAs. The recitations will involve a mixture of extra practice on calculations and derivations similar to those assigned in the homework; groupwork in the setup of the longer and more complicated homework problems; organization for the Observing Project; and review for the exams. All students are expected to attend one recitation/workshop per week. It doesn’t matter which one; go to different recitations on different weeks if you like.

Observing project: one observing project, involving the use of the 24-inch telescope at Mees Observatory, and an advanced, large-format CCD camera with a variety of filters. The observations will require two or three nighttime observing trips to Mees and several additional observations with the other telescopes. The Mees trips depart from campus at about 6 PM and return at about 3 AM. Students will form teams, 2-4 strong, to design and conduct the observations, and will operate the telescope and camera themselves at the observatory, under the supervision of the instructors. Naturally the schedule for these trips will have to be set based upon the weather and the schedules of the teams involved. Particularly the weather: we will plan for the observations to be complete by the middle of October, before the clouds and snow set in. Observing reports are due in class on 3 November 2011.
E-mail list server: ast111@pas.rochester.edu. Messages sent to this address will be re-sent to everybody in the class. Obviously this provides a good way to make general announcements. We also encourage use of the list server to ask questions about readings, lectures, homework problems and the like; the rest of the class will probably also be interested in your questions and the answers you’ll receive. (We will answer e-mail questions privately, too.)

Homework assignments: ten problem sets, to be assigned at regular intervals during the semester. The problem sets count equally toward the final grade. Normally, detailed solutions to the homework problem sets will be distributed and posted on the Web site at the time they are due, which will make it very difficult to accept late homework.

Examinations: two midterms, given during the usual lecture times on 20 October and 13 December 2011, and a final exam, 4:00-7:00 PM, on Wednesday, 21 December 2011. They will all take place in the lecture room, 2-110E Dewey Hall. You must take all three tests in order to pass the course. If you miss an exam due to illness or emergency, a makeup exam may be scheduled by appointment. All makeups will be oral examinations, the same duration as the written exam, administered and graded by Dan Watson.

To each exam you are allowed to bring only a writing instrument, a calculator, and one letter-size sheet on which you have written as many notes, formulas, and physical constants as you like. No computers, or graphing calculators into which text and graphics may be downloaded, are allowed.

The best way to study for the examinations is to do the homework, and to work out the sample exams that are available (with solutions) in our World Wide Web pages.

Note how close the final exam is to Christmas. This may pose difficulties in your travel schedule, so please make your holiday travel plans soon.

Grades: based 25% on the ten homework assignments, 10% on the Observing Project, 20% for each midterm and 25% for the final exam. Final grades will be set by an absolute scale, rather than by the curve. In terms of the maximum possible percentage score, the grading scale will be as follows:

<table>
<thead>
<tr>
<th>Percentage score</th>
<th>≥ 80</th>
<th>≥ 75</th>
<th>≥ 70</th>
<th>≥ 65</th>
<th>≥ 60</th>
<th>≥ 55</th>
<th>≥ 50</th>
<th>≥ 45</th>
<th>≥ 35</th>
<th>&lt; 35</th>
</tr>
</thead>
<tbody>
<tr>
<td>Final grade</td>
<td>A</td>
<td>A-</td>
<td>B+</td>
<td>B</td>
<td>B-</td>
<td>C</td>
<td>C+</td>
<td>C-</td>
<td>D</td>
<td>E</td>
</tr>
</tbody>
</table>

Past experience shows that students who don’t do and turn in the homework problem sets are unlikely to do well in the exams. Please see Dan immediately if you find yourself in this situations. Early action (and good planning) may help you improve your experience.

Academic honesty disclaimer: You are free to collaborate in workshops, and observations, and in general on the setup of homework problems. However, all examinations, observation reports and solutions to homework problems must be your own work, written solely by you. For our purposes, cheating consists of submission of homework or exam solutions that are not your own work, or submission of solutions under someone else’s name. According to University rules, any detected act of cheating that is not the result of a simple misunderstanding must be handed over to the Board on Academic Honesty for investigation.

Extra help: Check out the class-meeting and office-hours calendar in the Astronomy 111 Web site to see where and when to find us most easily. Appointments can also be arranged. Please come in and see us frequently. We will also answer questions by e-mail (privately or through the list server), and will often be electronically accessible late into the night when due dates or exams approach. By either means we will be happy enough to answer any questions you have concerning the course, and even happier to help those who find the material or presentation sufficiently confusing that they’re not even sure what to ask.