AST 301 (Scalo)
Reading outline for chapters 6 and 15 (online only)

Chapters 6 "The solar system" and 15 "The formation of planetary systems" are not in your textbook (assuming you bought vol. 2 only), but are only available to read in the online version of your textbook. Connect as usual through the course website. Check as soon as possible that you can access the ebook for the next readings.

Here is a guide to the sections that you should read and we will cover in class. Please consult the "Guide to reading and study" for end of chapter questions, etc.

6.1 An inventory of the solar system p. 146. Not much here—just a description of this chapter. Notice the emphasis that will be given to ***extrasolar planets*** (=planets discovered orbiting other stars), which is part of Ch. 15 and is emphasized more strongly in the lecture slide outlines: A huge emphasis in this part of the course.

6.2 Measuring the planets p. 148.

Look over the methods listed on p. 148 for obtaining properties of planets. Most of them should be familiar to you by now.

You do not have to memorize ANY of the numbers in Table 6.1. I'll tell you on the review sheet which numbers you will need to know. You SHOULD know that we measure distances in the solar system in units of the AU, and why, and that the distances of planets from the Sun are ~ 0.4 to 50 AU. (There is a slight change since this edition of the book: Pluto is no longer a planet. This is irrelevant to us, so don't worry about it.)

And you should understand the significance of some of these. I would say that **DENSITY** is the most important of these—you should be able to explain why by the time of the next exam.

6.3. Overall layout of the solar system p. 149

Commit Fig. 6.5 to your visual memory.

More precisely 6-1 is just an example of how Newton's laws can be simply applied to get the mass of Jupiter using the orbit of its satellite Europa. You don't have to be able to reproduce the numbers in order to understand the method.

6.4 Terrestrial and Jovian planets p. 151

This is one of the two most important subsection in ch. 6 (6.7 is the other). The difference in properties of terrestrial and Jovian planets is the key to theories of planet formation. See Table 6.2. Many of those properties are still not explained. **The list on p. 153 is especially useful.**

6.5 Interplanetary matter p. 153

Asteroids, comets, dust, …. Why care about this "debris"?

6.6 Spacecraft exploration p. 155

This is almost entirely for your own interest, but I do not expect you to read about the numerous space missions to the various planets. The two objects of interest in this regard are Mars and the satellite Titan, both because of the possibility they may harbor biological material now, or in the distant past.

6.7 How did the solar system form? p. 161.

This is the second very important (and long) subsection (the other was 6.4) , and we will spend a lot of time in class on this topic. You should read about "angular momentum" so you can explain why Fig. 6.17 is drawn as it is. This theme is taken up again in chapter 15 that follows.

End of chapter questions, online textbook questions, etc. to try are in the reading and study guide, available at the course website if you don't already have it or have lost it.

Then we will skip over the details of solar system objects in chapters 7-14, and proceed to chapter 15, on theories and evidence for how our solar system formed, and whether it is typical or unusual in our Galaxy.

Chapter 15. The formation of planetary systems p. 388.

All sections will be covered, but especially important are 15.6 and 15.7 on the detection and nature of extrasolar planets. This has been one of the major developments in astronomy in the past decade, and we are on the brink of finding whether there are other "Earths" out there orbiting other stars. I want you to understand techniques available for doing this, and why it is so difficult. There is also a lot known already (more than 300 extrasolar planets discovered so far, mostly gas giants like Jupiter), which has shown us that our solar system may not be typical…

This material is covered in much more detail beginning with slide 22 of the second pdf of the lecture slides for this part of the course.