

ASTR330: Spring 2022

The Solar System



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Class Textbook: *An Introduction to the Solar System* edited by David Rothery, Neil McBride and Iain Gilmour, 2018 edition, ISBN 9 781108 430845. I recommend that you get the [2018 edition](#) (new: \$50-\$60, used: \$30-\$40). I expect you to read it cover to cover over the course of the semester! If you have access to a very cheap 2011 version of the textbook, feel to get that. Here are some errors in the various editions: [Errata: 2018 edition](#), [Errata: 2011 edition](#), and [Errata: 2004 edition](#)

Class Web Page: <http://www.astro.umd.edu/~hamilton/ASTR330/>

Course Description:

This course is intended primarily for juniors and seniors who are not majoring in the physical sciences and who have successfully completed either ASTR 100 or ASTR 101. The course will emphasize the way in which we combine different types of information to answer fundamental questions about the Solar System, such as

- How did the Solar System form?
- How have the planets evolved subsequent to formation?
- Are there planetary systems like our own orbiting other stars?

Accordingly, we will consider the important physical and chemical processes in the Solar System and illustrate them with examples from the real planets, moons, and small bodies, rather than exploring these objects one by one.

We will consider how our ideas have changed over the centuries, as well as the most modern data. What was Galileo's view of the Solar System? How has our view changed and how has the spacecraft named for Galileo helped to change this view? What are all the new Kuiper Belt (or Trans-Neptunian) Objects that we have

discovered in the outer Solar System over the last 30 years and what relation do they have to the objects we have known about for centuries? Why do we need to send spacecraft out into the Solar System?

We will use a little mathematics in this course and a lot of physical reasoning, and we will use information from geology, meteorology, and physics as well as from astronomy, all sciences that have contributed importantly to planetary science. Your challenge will be to master this diverse and extensive body of knowledge and my goal is to help you accomplish this.

Course Expectations:

Attendance: In order to succeed in this course, I expect you to attend all lectures which will be held in person, unless we hear otherwise. This is very important! The material on the homeworks and exams are based upon the material covered in the lectures and in the text. If you have to miss a lecture be sure to look at the class slides and, ideally, another student's notes to make sure that you understand what was covered. There will be multiple times during the semester when I will ask for written responses to questions in short quizzes and in group work. Your written answers will count towards your participation grade in the class.

Preparation: I expect you to be prepared to work. You will understand the lecture more easily if you preview the reading assignment. A more careful reading is recommended after lecture. It is also good to study your class notes sometime before the next lecture to make sure that everything is clear. I encourage you to ask questions in class, during office hours, or over email.

Study Habits: Study wisely and ask for help if you need it. If you just cram the night before the exam, you probably will not do very well. It is better (and easier) if you keep up with the material on a daily basis. Make it a point to read the chapters in pace with the lectures; this is one of the best study habits you can have. If you have questions, please see me.

Grading:

I grade on a point scale with different assignments weighted as shown in the table.

ASSIGNMENT	Homework	Exam I	Exam II	Participation	Final	Total
POINTS	200	100	100	100	200	700

Letter grades will be assigned based upon your curved cumulative score. Here is how your grade will be determined from your point total in the class.

Letter Grade	Course Total	Percentage
A	630-700	90%-100%
B	560-629	80%-89%
C	476-559	68%-79%
D	385-475	55%-67%
F	0-384	0%-54%

The point scale makes it possible for everyone in the class to do well. For example, if everyone scores above 80% in the course, you would all receive either a B- or better letter grade. I do use +/- modifiers - you will get a "+" if you are in roughly the upper 1/3 of students with the same letter grade and a "-" if you are in the lower 1/3. I may adjust the number of points required to get a given grade depending on the class averages; however, any adjustment will make it easier to get a given grade, never more difficult. You can monitor my current estimate of your grade from the class webpage as the semester progresses.

Exams

There will be two in-class midterm exams. These exams are closed book with no electronic devices allowed. The exams emphasize understanding of concepts rather than memorization and, accordingly, you may refer to a single page of your handwritten or typed notes (front and back). Each exam will consist of short answer questions, numerical questions, and essay questions. These exams allow you to show how well you are keeping up with the class material. The schedule of lectures included in this syllabus shows which chapters will be covered on each exam. If for whatever reason, the University is *officially* closed on the exam date, the exam date shifts to the next lecture date. Finally, and this should not need to be said but my prior experience says otherwise: please use the facilities before taking your seat as no one will be allowed to leave the classroom until the exam period is over.

According to University rules, **the final exam for this course will be held on Monday, May 16 from 10:30am to 12:30pm in our classroom.** This final exam is cumulative, that is, it will cover *all* material discussed in this course. However, since some chapters will not be covered by the midterm exams (see Lecture Schedule), *the weight on these chapters will be higher than on earlier chapters.* The final will include short answer, essay, and problem solving questions with the exact combination to be determined. This exam, like the midterms, are closed book with no electronic devices allowed. You may bring three pages (front and back) of your handwritten or typed notes.

Missed Exams

If you are not able to take an exam due to illness or other legitimate reasons (as outlined in the Academic Info section of the schedule of classes) and you wish to take a make-up exam, you must

- 1) contact me by email **before** you miss the regularly-scheduled exam and
- 2) submit a valid written excuse for your absence **within one week** after the regularly-scheduled exam.

Homeworks

There are a total of six homeworks in this course. All homeworks will be made available from ELMS, will be turned in there, and will be graded and returned to you there as well. Assignments are due on the due date by 11:59pm. Late homeworks will be assessed a late penalty; to avoid this, feel free to turn your homework in early. Please type up your assignments and convert them to PDF format before turning them in on ELMS.

Although you may discuss the homework problems with your friends, the final writeup **must be in your own words**. Copying from a friend's homework, copying from a book, or allowing a friend to copy your homework is academic dishonesty and will not be tolerated in this class. If you consult a reference other than the course text, please acknowledge it in your homework - **this includes websites!**

Participation

One hundred points will be based on your in class participation. Many things will count toward this score including interactive and individual work done in class, attendance as measured by bonus point questions and chat activity, mini in-class quizzes based on the book chapters, and attentiveness and interactivity during class. The best way to succeed in any class is to attend and pay attention to lecture, to read the book, and to think critically about the course material. Participation points are designed to encourage these activities. Phones and the internet are distractors in class and have been demonstrated to lead to poorer academic performance. I will do my best to make the class periods lively, informative, and entertaining - please do your part by turning your devices off and focusing your attention on the class.

Extra Credit

There will be no extra credit papers or projects. The following are the *only* ways to earn extra credit in this class:

- Attend Class: I will occasionally ask questions worth bonus points during lectures.
- Ace the class quizzes - you can earn more than 100% on them.

Academic Integrity

The University of Maryland, College Park has a nationally recognized Code of Academic Integrity, administered by the Student Honor Council. This Code sets standards for academic integrity at Maryland for all undergraduate and graduate students. As a student you are responsible for upholding these standards for this course. It is very important for you to be aware of the definitions and consequences of cheating, fabrication, facilitation, and plagiarism. For more information on the Code of Academic Integrity or the Student Honor Council, please visit <http://www.shc.umd.edu/SHC/Default.aspx>; pay particular attention to the links for students. **We are very serious about this.**

Covid Information

The campus has several rules designed to maximize your safety, one of which requires all of us to wear a KN95 or better mask indoors at all times. These masks are simple device designed to protect you and others. Please comply with the campus rules and alert me to anyone near you who is acting irresponsibly by not wearing their mask properly. If you have flu-like symptoms, stay home and call the UMD Covid19 hotline at (301) 405-4325 for advice on how to return to campus safely.



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ASTR330 LECTURE SCHEDULE

Lecture Date	Lecture Topic	Reading
Tue. Jan. 25	A Tour of the Solar System	Chapter 1
Thu. Jan. 27	A Tour of the Solar System	
Tue. Feb. 1	A Tour of the Solar System	
Thu. Feb. 3	The Origin of the Solar System	Chapter 8; HW#1 due
Tue. Feb. 8	The Origin of the Solar System	
Thu. Feb. 10	Terrestrial Planet Interiors	Chapter 2
Tue. Feb. 15	Terrestrial Planet Interiors	
Thu. Feb. 17	Terrestrial Planet Interiors	HW#2 due
Tue. Feb. 22	Terrestrial Planet Interiors	
Thu. Feb. 24	EXAM I	Chapters 1-2,8
Tue. Mar. 1	Planetary Volcanism	Chapter 3
Thu. Mar. 3	Planetary Volcanism	
Tue. Mar. 8	Planetary Volcanism	
Thu. Mar. 10	Planetary Volcanism	HW3 due
Tue. Mar. 15	Planetary Surface Processes	Chapter 4
Thu. Mar. 17	Planetary Surface Processes	
Tue. Mar. 22	SPRING BREAK!!	
Thu. Mar. 24	SPRING BREAK!!	
Tue. Mar. 29	Terrestrial Planet Atmospheres	Chapter 5
Thu. Mar. 31	Terrestrial Planet Atmospheres	HW#4 due
Tue. Apr. 5	The Giant Planets	Chapter 6
Thu. Apr. 7	EXAM II	focus on Chapters 3-5, some earlier material
Tue. Apr. 12	The Giant Planets	
Thu. Apr. 14	The Giant Planets	Chapter 7
Tue. Apr. 19	Minor Bodies of the Solar System	
Thu. Apr. 21	Minor Bodies of the Solar System	
Tue. Apr. 26	Minor Bodies of the Solar System	HW#5 due
Thu. Apr. 28	Tides and Planetary Satellites	
Tue. May 3	Planetary Rings	
Thu. May 5	Meteorites	Chapter 9 (just skim pp. 340-345 which is pretty technical)
Tue. May 10	Meteorites, Final Review	HW#6 due

Mon. May 16	FINAL EXAM (10:30am- 12:30pm)	Chapters 1-9
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