

# ASTR 101

## The Sun and its Planets

Fall 2019

TR 11:30AM-12:45PM

TBD

Instructor:

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**Website:** <http://astroweb.case.edu/ssm/astr101/>

The syllabus, all assignments, homework, etc. are posted on the course website. Check frequently for updates and schedule changes.

**Textbook:** *Cosmic Perspective - Solar System* (8th edition)

by Bennett, Donahue, Schneider, & Voit.

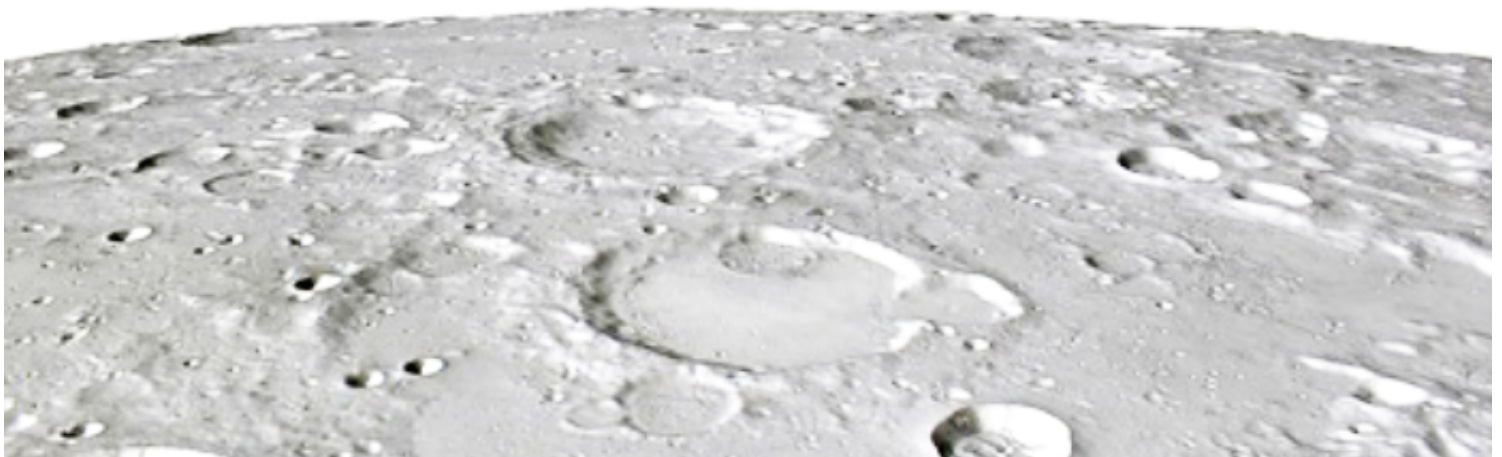
*It shouldn't matter whether you use the electronic version or a hardcopy, but be sure to take the homework questions from the correct edition of the text.*

### Course Description

An overview of the solar system; the planets and other objects that orbit about the Sun and the Sun itself as the dominant mass and the most important source of energy in the solar system. Concepts and the development of our knowledge will be emphasized. Not available for credit to astronomy majors.

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# ASTR 101 LECTURE SCHEDULE

Date	Lecture Topic	Reading	Work Due
Aug. 27	<a href="#">Cosmic Scale</a>	Chapter 1	
Aug. 29	<a href="#">Scientific Method</a>	Chapter 3	
Sep. 3	<a href="#">Appearance of the Sky</a>	Chapter 2	
Sep. 5	<a href="#">Lunar Phases &amp; Eclipses</a>	Chapter 2	
Sep. 10	<a href="#">Competing Cosmologies</a>	Chapter 3	HW#1 DUE
Sep. 12	<a href="#">Kepler's Laws</a>	Chapter 3	
Sep. 17	<a href="#">The Laws of Motion</a>	Chapter 4	
Sep. 19	<a href="#">Exam I Review</a>	Chapters 1-4	HW#2 DUE
Sep. 24	<b>EXAM I</b>	Chapters 1-4	Exam Day
Sep. 26	<a href="#">Electromagnetic Radiation</a>	Chapter 5	
Oct. 1	<a href="#">Kirchhoff's Laws</a>	Chapter 5, 6	
Oct. 3	<a href="#">Telescopes and Techniques</a>	Chapter 7	
Oct. 8	<a href="#">Solar System Formation</a>	Chapter 8	HW#3 DUE
Oct. 10	<a href="#">Terrestrial Planets: General</a>	Chapter 9	
Oct. 15	<a href="#">Terrestrial Planets: Individual</a>	Chapter 9	
Oct. 17	<a href="#">Terrestrial Planets: Atmospheres</a>	Chapter 10	HW#4 DUE
Oct. 24	<a href="#">Exam II Review</a>	Chapters 5-10	
Oct. 29	<b>EXAM II</b>	Chapters 5-10	Exam Day
Oct. 31	<a href="#">Planetary Climates</a>	Chapter 10	
Nov. 5	<a href="#">Jovian Planets</a>	Chapter 11	
Nov. 7	<a href="#">Moons of the Solar System</a>	Chapter 11	
Nov. 12	<a href="#">Asteroids &amp; Meteorites</a>	Chapter 12	HW#5 DUE
Nov. 14	<a href="#">Comets; Pluto</a>	Chapter 12	
Nov. 19	<a href="#">Exoplanets</a>	Chapter 13	
Nov. 21	<a href="#">The Sun</a>	Chapter 14	
Nov. 26	<a href="#">Drake's Equation</a>	Chapter 24	
Dec. 3	<a href="#">Exam III Review</a>	Chapters 11 - 14	HW#6 DUE
Dec. 5	<b>EXAM III</b>	Chapters 11 - 14	Exam Day

## Learning Outcomes

After taking this course, students should be able to

- Relate observations of the night sky: rising and setting motions, lunar phases, stars and planets
- Describe Earth's motion in space and how it affects the sky we see
- Explain the reasons for seasons, lunar phases, and eclipses
- Outline the Ptolemaic and Copernican cosmologies
- Describe the roles of Copernicus, Brahe, Kepler, and Galileo in the Scientific Revolution
- Describe and apply Newton's Laws of Motion and Universal Gravity
- Explain the nature of electromagnetic radiation
- Describe thermal radiation and Kirchoff's Laws
- Summarize properties of telescopes and their instrumentation
- Discuss solar system formation and structure
- Describe properties of planets, their moons, dwarf planets, comets, and asteroids
- Explain the techniques for detection of exoplanets
- Discuss the general properties of known exoplanets
- Distinguish the basic traits of legitimate science, and the methods of scientific reasoning
- Paraphrase conceptual ideas through written and verbal work (homework, exams, and papers)

## Grading

Grades are based on a point scale with different assignments weighted as shown in the table. The points are distributed across a variety of exercises so that no single thing will dominate your grade. However, this also means that it is imperative that you complete all assignments. There are no make-ups for missed or late homeworks. We will drop the lowest homework, so you get one free pass.

ASSIGNMENT	Homeworks	Exam I	Exam II	Exam III	Total
POINTS	150	120	120	120	510

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

Letter Grade	Course Total	Percentage
A	> 450	> 88%
B	400-450	78%-88%
C	340-399	67%-78%
D	255-339	50%-67%
F	< 255	0%-49%

The point scale makes it possible for everyone in the class to do well. For example, if everyone scores above

90% in the course, you would all receive A's. On the other hand, if no one does this well, I may adjust the number of points required to get a given grade. Any adjustment will make it easier to get a given grade, never more difficult (i.e., any curve that is applied can only benefit your grade).

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## Academic Honesty

Simple rule: DON'T CHEAT.

Cheating includes but is not limited to copying from another's work; falsifying problem solutions or laboratory reports; or using unauthorized sources, notes or computer programs; or otherwise failing to follow the instructions or procedures in place for a particular testing situation. Cheating is further defined in [the Bulletin](#).

An example of an unauthorized source is Chegg. Do not look at it. Do not copy from it. Do not use it in any way. It is often wrong and easy to spot. You are always better off doing your own work. So just do your own work.

The penalty for cheating is a zero on the affected assignment. A zero earned in this fashion cannot be dropped as a low score. Cheating a second time will result in a full letter reduction in the final grade. Any further infractions will result in failure of the entire course.

## Homeworks

Assignment	Points	Due Date
<a href="#">Homework #1</a>	30	Tuesday, Sep. 10
<a href="#">Homework #2</a>	30	Thursday, Sep. 19
<a href="#">Homework #3</a>	30	Tuesday, Oct. 8
<a href="#">Homework #4</a>	30	Thursday, Oct. 17
<a href="#">Homework #5</a>	30	Tuesday, Nov. 12
<a href="#">Homework #6</a>	30	Tuesday, Dec. 3

There are 6 homeworks with 6 problems worth 5 points each, plus one extra credit problem worth 2 points for each homework assignment. We will drop your lowest homework score so that your grade will be based on the best 5 out of 6 homework assignments. *There will be no make-ups. Neither will there be extra credit, except for the occasional in-class exercise.*

All homeworks are due at the *beginning* of lecture on the date specified. Homeworks are late (and suffer a 5 point penalty) after lecture begins. The end of lecture is the last opportunity to turn in homeworks with a 5 point late penalty. After that, homeworks will no longer be accepted.

Always put your name on your homework. Be sure to type or write neatly - we can not give credit for things we can not read. The point is to demonstrate understanding. Don't just say "42." *Succinctly* explain *why* your answer is correct.

# Exams

Exam	Points	Date	Time	Place
Exam I	120	Tuesday, Sep. 24	11:30am-12:45pm	TBD
Exam II	120	Tuesday, Oct. 29	11:30am-12:45pm	TBD
Exam III	120	Thursday, Dec. 5	11:30am-12:45pm	TBD

## Exams

There will be three in-class examinations during the semester as noted above. These exams are closed book with no notes, calculators, cell phones, ipods, or implants allowed. Each exam will consist of multiple choice questions, essay questions, and problem solving. Just your brain and the writing instrument of your choice. If for whatever reason, the University is *officially* closed on the exam date, the exam shifts to the next lecture date.

## Missed Exams

The first rule of missing exams is:

**DON'T**

If you are not able to take an exam due to illness or some other legitimate reason and you wish to take a make-up exam, you **must**

1. contact me (by voice or e-mail) **before** you miss the regularly-scheduled exam and
2. document a valid excuse for your absence.

Make-up exams must be taken promptly.

## ASTR 101 HOMEWORK ASSIGNMENTS

Homework problems are assigned from the 8th edition of the textbook *The Cosmic Perspective - The Solar System*.

*Be sure you are doing the right homework problems!* Other editions of the text will have different questions.

There are 6 homeworks with 6 problems worth 5 points each, plus one extra credit problem worth 2 points for each homework assignment. There are no make-ups, for illness or otherwise, but we will drop the lowest homework.

All homeworks are due in class at the *beginning* of lecture on the date specified. Homeworks are late (and suffer a 5 point penalty) after lecture begins. The end of lecture is the last opportunity to turn in homeworks with a 5 point late penalty. After that, homeworks will no longer be accepted.

Remember to put your name on your homework! Be sure to type or write neatly - we can not give credit for things we can not read.

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## Homework #1 (30 Points) Due Tuesday Sep. 10

### Chapter 1

1. *Does It Make Sense?* **1-13, 14, 16, 17, 18**
2. **1-42** *Spacecraft Communications*
3. **1-46** *Driving Trips*

### Chapter 2

4. *Does It Make Sense?* **2-17, 19, 22, 24, 26**
  5. **2-40** *New Planet*
  6. **2-53** *Sun's Diameter*
- Extra credit
7. **2-55** *Eclipse Conditions*
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## Homework #2 (30 Points) Due Thursday Sep. 19

### Chapter 3

1. **3-44** *Chinese calendar*
2. **3-45** *Method of Eratosthenes I*
3. **3-48** *Eris Orbit*

### Chapter 4

4. *Does It Make Sense?* **4-16, 17, 18, 19, 24**
  5. **4-52** *Understanding Newton's Version of Kepler's Third Law*
  6. **4-55** *Weights on Other Worlds*
- Extra credit
7. **3-50** *Halley Orbit*
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## Homework #3 (30 Points) Due Tuesday Oct. 8

### Chapter 5

1. *Does It Make Sense?* **5-17, 18, 20, 21, 23**
2. **5-47** *Human Wattage*
3. **5-54** *Hotter Sun*
4. **5-56** *Doppler Calculations*

### Chapter 6

5. *Does It Make Sense?* **6-13, 14, 15, 19, 20**
  6. **6-42** *Light Collecting Area*
- Extra credit
7. **6-44** *Finding Planets*
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## Homework #4 (30 Points) Due Thursday Oct. 17

Chapter 7

1. *Does It Make Sense?* 7-13, 15, 16, 19, 20
2. 7-39 *Size Comparisons*

Chapter 8

3. 8-45 *Radiometric Dating*
4. 8-50 *What are the odds?*

Chapter 9

5. 9-43 *Dating Planetary Surfaces*
6. 9-57 *More Plate Tectonics*

Extra credit

7. 7-44 *Mission to Pluto*
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## Homework #5 (30 Points) Due Tuesday Nov. 12

Chapter 10

1. *Does It Make Sense?* 10-23, 24, 28, 29, 32
2. 10-57 *The Mass of an Atmosphere*
3. 10-58 *The Role of Reflectivity*

Chapter 11

4. 11-49 *Disappearing Moon*
5. 11-52 *Orbital Resonances*
6. 11-53 *Titanic Titan*

Extra credit

7. 10-61 *Escape from Venus*
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## Homework #6 (30 Points) Due Tuesday Dec. 3

Chapter 12

1. 12-45 *Adding Up Asteroids*
2. 12-46 *Impact Energies*

Chapter 13

3. *Does It Make Sense?* 13-18, 19, 22, 23, 27
4. 13-50 *Planet Around 51 Pegasi*
5. 13-52 *Finding Orbit Sizes*

Chapter 14

6. *Does It Make Sense?* 14-19, 21, 23, 26, 27
7. 14-50 *Lifetime of the Sun*

Extra credit

8. 13-49 *Transit of TrES-1*
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