AST 301
Introduction to Astronomy

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AST 301
Introduction to Astronomy
Fall 2010   MWF 11:00-12:00

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Hours: T,Th 11-12 & after class

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Review session: RLM 15.216B Wed 5-6
web: www.as.utexas.edu → courses → AST 301 (Lacy)

Text: "The Cosmic Perspective" by Bennett et al., 5th or 6th ed. (earlier editions probably OK, too)

Prerequisites: No prior college science or math courses are required. We will use high-school algebra in class and on homework.

Contents: The emphasis in this course will be on explanations for the phenomena and objects that occur in the Universe and how astronomers learn about them. This is a course for non-science majors, and no knowledge of physics is assumed, but we will discuss physical laws and how astronomers use them to explain their observations.

In-class interactive learning activities will be an important part of this course. Consequently, attendance and participation is required. You are also required to finish each week's reading assignment before class on Monday, so that you are prepared to participate in discussions. A weekly reading quiz and credit for assignments done during class will help encourage you to do the reading and participate in class.

Homework: A homework assignment will be handed out most Fridays, due the next Friday at the beginning of class. Some assignments will involve observations of the sky. You are encouraged to work together on homework, but you must write out your own answers and describe your own observations, in your own words. Duplicate homeworks will not receive credit. Late homeworks will be accepted for half credit until homeworks are returned.

Tests: There will be a quiz each Monday on the reading for that week and the topics covered the previous week. There will be four in-class exams and a final exam. Late exams will not be given (but see policy on dropped exams below). Exams will emphasize material discussed in class, but may include topics covered only in the text. All quizzes and exams will be closed-book and closed-notes, and calculators will not be allowed (or needed).

Grades: Grades will be based on homework (20% of the grade), the weekly quizzes (10%), in-class assignments (10%), the four exams (30%), and the final (30%). Your lowest quiz and homework scores (one of each) will be dropped. Your lowest exam score will be dropped, or if you want to keep all four exams, you may skip the final and your exam average will replace the final.

Collaboration: You are encouraged to study and work on homework assignments with other students, and you are encouraged to get help from the TA, but you must write out your own answers and make the assigned observations yourself. If you copy another homework or let someone copy yours, both of you will receive zero credit. In-class assignments will be done in groups, and all group members will receive the same grade (if the assignment is graded).

Schedule:

Week of:	Reading:	Topics:	Exams:
Aug 25	Ch 1	Our Place in the Universe	
Aug 30	Ch 2	Motions in the sky	
Sep 8	Ch 3	History of Astronomy	
Sep 13	Ch 4	Laws of motion	Fri, Sep 17
Sep 20	Ch 5	Light and Matter	
Sep 27	Ch 7&8	Solar System & Formation	
Oct 4	Ch 10	Atmospheres	
Oct 11	Ch 11	Outer solar system	Fri, Oct 15
Oct 18	Ch 13	Other planetary systems	
Oct 25	Ch 14.2&15	Properties of stars	
Nov 1	Ch 17	Lives of stars	
Nov 8	Ch 18	Deaths of stars	Fri, Nov 12
Nov 15	Ch 20	Galaxies and the Universe	
Nov 22	Ch 22	Cosmology	
Nov 29	Ch 23	Big Bang	Fri, Dec 3

Other things

Courtesy

It is extremely annoying to other students for you to talk to neighbors or use cell phones in class.

If you do, you will be thrown out of class.

Questions

If you have questions in class, please ask.

Almost certainly other students have the same question.

When you ask, speak loudly!

# The Moon and planets this semester

New moon is about a week into each month this semester, so the Moon is up in the evening for the middle of each month. We will watch the Moon to see how its position in the sky changes as it goes through its phases.

Venus and Mars (and maybe Saturn) are visible low in the west soon after sunset now. Arcturus is above them and Spica above and to their left.

Jupiter is rising the in east by about 10 PM. It will rise earlier and earlier during the semester.

Mercury will be visible in the evening the last week of November.

Looking west this evening
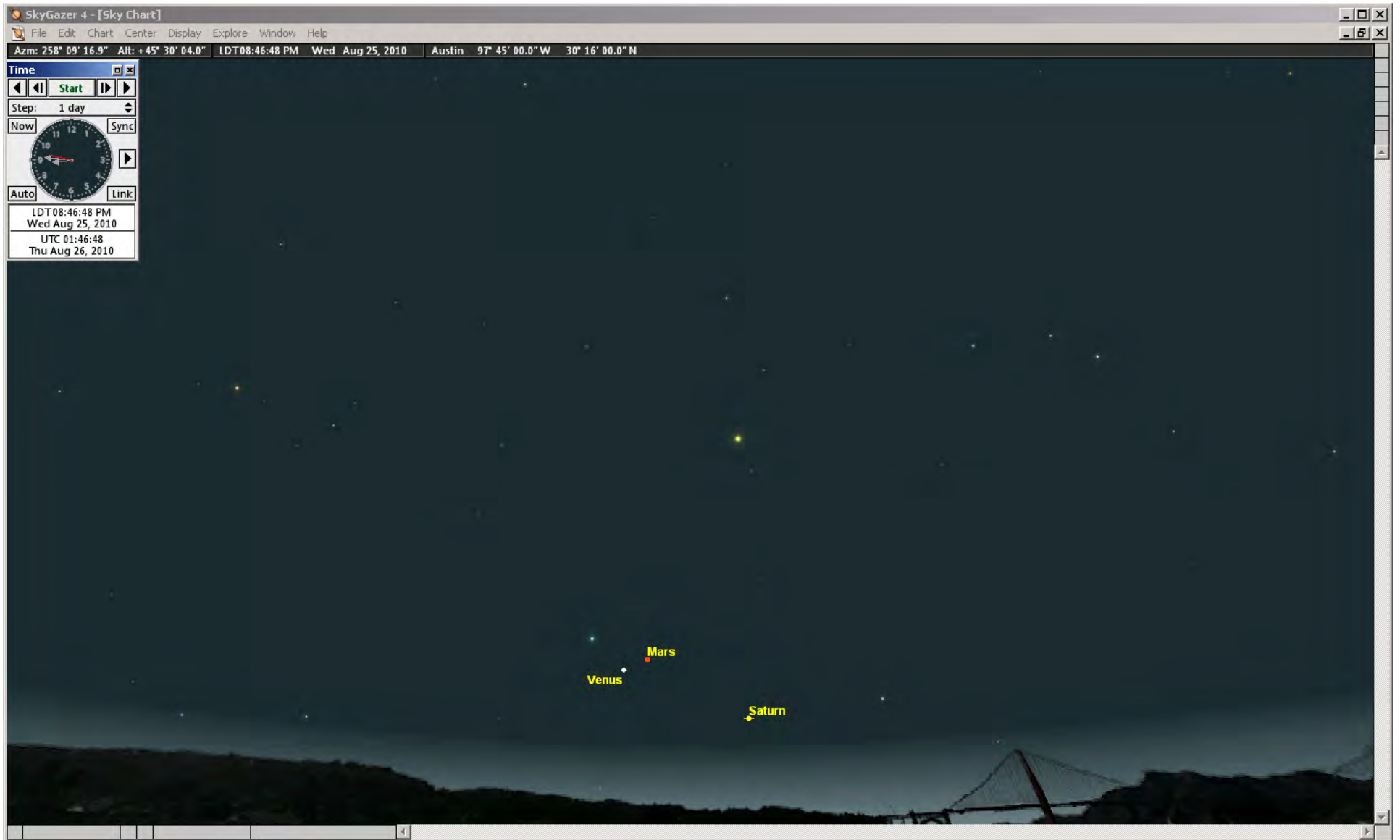
Watch Venus and Mars move in the sky

For the next week or two you can watch Venus and Mars move relative to Spica.

Find a place you can go at about 8:30 PM where no buildings block your view to the west.

Go there at least 3 times in the next 2 weeks.

Sketch the positions of Venus, Mars, and Spica, as well as some landmarks on the horizon.

Write down the date and time, your location, the weather, and the names of any companions.

This assignment is due Friday, Sep. 10.

How big is the Universe?

I'm not sure we can answer that question.

But we can answer how big some parts of the Universe are.

How big is the Earth?

The diameter of the Earth is about 8000 miles.

The circumference of the Earth is about 24,000 miles.

That's about 40,000 km.

If someone built a bridge over the oceans, how long would it take you to walk around the Earth?

How long would it take you to walk around the Earth?

A. 1 month

B. 1 year

C. 10 years

D. 100 years

Maybe you could average 1 mph, or 24 miles in a day.

That's 40 km/day.

Since the circumference of the Earth is 40,000 km, it would take you 1000 days, or about 3 years.

How long would it take you to walk around the Sun?

What do you need to know to answer this?

How big is the Sun?

The diameter of the Sun is about 100 times the diameter of the Earth.

How does the circumference of the Sun compare to the circumference of the Earth?

A. It is 100 times the circumference of the Earth.

B. It is 100π times the circumference of the Earth.

C. It is 100^2 times the circumference of the Earth.

D. It is $\pi \times 100^2$ times the circumference of the Earth.

How does the circumference of the Sun compmare to the circumference of the Earth?

A. It is 100 times the circumference of the Earth.

B. It is 100π times the circumference of the Earth.

C. It is 100^2 times the circumference of the Earth.

D. It is $\pi \times 100^2$ times the circumference of the Earth.

The formula relating circumference and diameter is:

$C = \pi\, D$ (or $C = 2\pi\, R$, since $D = 2R$)

For the Earth: $C = 40{,}000$ km $= \pi \times 13{,}000$ km

For the Sun: $C = 4{,}000{,}000$ km $= \pi \times 1{,}300{,}000$ km

If you multiplied one side of the equation by 100, you must have multiplied the other side by 100.

How long would it take you to walk around the Sun?

A. 3 years
B. 30 years
C. 300 years
D. 3000 years

If the Sun is 100 times bigger than the Earth (in circumference) it would take you 100 times longer to walk around the Sun than to walk around the Earth.

Assignments for Friday

Read Chapter 1.

Find a place where you can see the western horizon and start looking for Venus, Mars, and Spica.

If it is clear enough to see them, make a sketch and write down the date, time, place, weather, and names of companions.