Texas Tech University Department of Physics

CRN 33731 Astronomy 1400 The Solar System

Course Information Spring, 2010

Lectures: 2.00-2.50 pm MWF, Sc 007. You will find it beneficial to attend regularly, since much of the material that I cover in class is not in your text, and because we will occasionally do small group exercises in class which count towards your class participation grade.

Text: *The Solar System, The Cosmic Perspective (5th Ed.)* by Bennett, Donahue, Schneider, and Voit. Published by Addison Wesley. It should come with Starry Night software.

Also for the lab: **Solar System Astronomy Lab Manual** by the Department of Physics, Texas Tech University

Instructor: Assistant Professor Maurice Clark. Office: Sc 014 Phone: 806-742-3781
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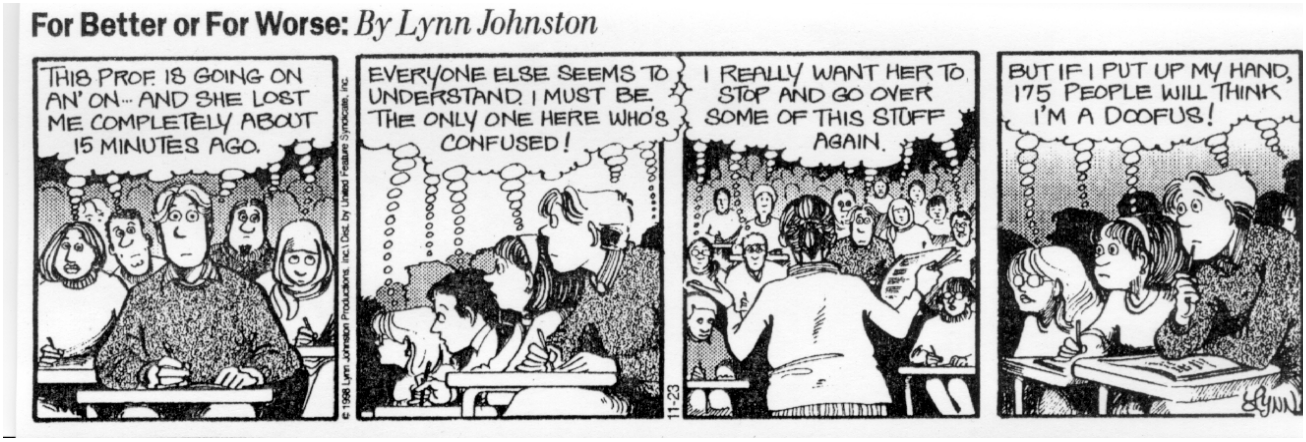
Office Hours: Wednesday 4:00-5:00. Friday 3.00-4.00 PM. These are the times when I will be available in my office for discussions on any problems you might be having with the course. You are also welcome to come up to my office at any other time, although I cannot guarantee to be available.

Grading:

Assignments	7 x 2%	14%.	(**A failing grade on the assignment component is a failing grade in the course.**)
Labs	9 x 2%	18%	(**A failing grade on the lab component is a failing grade in the course.**)
Observing labs:	4 x 4%	16%	
Course Participation:		7%	
Mid-term Tests:	3 x 7%	21 %	
Comprehensive final		24%	(Just what the name implies)

Grades: The following are the grades to be awarded for this course and the *approximate* scores for which they will be awarded.

A	Has met the course objectives with distinction.	85% +
B	Has met the course objective with credit	73% - 84%
C	Has met the course objectives.	60% - 72%
D	Has met some of the course objectives.	50% - 59%
F	Has failed to meet the course objectives.	49% or less.



Course Format: We will be covering the course material in lecture format on Mondays, Wednesdays and Fridays. However I want to encourage you to ask questions during the lecture. Whether about the lecture, the text or about any problems you encounter. Remember…. **NO** question is too stupid to ask!!! If you are unsure about something, it is almost certain the several others will be as well. Be sure to let me know if I mention something you are unfamiliar with and help me adjust the pace of the course to better suit your needs. During the course we will be studying worlds far different to our own. From the huge to the tiny, from the densest to the most tenuous, from the hottest to the coldest, even things that cannot be seen. In studying these, we will use tools from many other branches of science, particularly physics and chemistry. Some mathematical skills are necessary as is a vivid imagination! By the end of the course I hope you leave with a deeper appreciation of the awesome universe that we are a part of and can understand why some people devote their lives to spending every possible moment, often in extremely isolated locations, regardless of temperature, to study its wonders.

What should you get from this course? To a large extent that will depend on you and how much work you are prepared to put in. At the very least there are four major points that I would hope you will gain from the course.

1. To better understand the solar system and the amazing variety of objects that comprise it.
2. To learn to ***think skeptically***, and to realize that science is more about searching for understanding than it is about knowing "The Truth".
3. To gain confidence in your abilities to learn something about which you knew little or nothing before attending this class.
4. To explore the ideas you are learning, both qualitatively (looking at the "Big Picture") and quantitatively (with math and numbers).

Course Purpose:

This course will satisfy a four hour laboratory science requirement. It has no pre-requisites. It serves well the student that is interested in astronomy and the student who is not science oriented but needs to satisfy the science requirement. This course is very important to both groups of students. For those interested (or who inadvertently become interested), it will give you the tools to continue astronomy as a lifelong interest. For those not really interested, astronomy will give you a basic understanding of science which is need for all educated members of society because the population at large determines the role of science in society — not just the scientists!

Expected Learning Outcomes:

Upon completion of this course, students will:

1. Gain a cosmic perspective.
2. Understand astronomy basics (eg: What is the ecliptic? Equinox? When do eclipses occur?)
3. Know the history of astronomy.
4. Understand the physics of astronomy at an elementary level and know how astronomers use it to learn about the universe.
5. Understand how telescopes work.
6. Understand the principles involved in the formation and maintenance of planetary atmospheres.
7. Understand the physical principles involved in the geology of the terrestrial worlds.
8. Understand why the Jovians formed as they did
9. Understand how a solar system forms
10. Study the nature and detection of extrasolar planets
11. Have the tools needed to continuing enjoying astronomy on their own as a hobby if desired, including using a simple telescope to make observations of and identify celestial objects.

Homework Assignments:

(a) There will be 7 homework assignments. These will be handed out in class on a Monday and will be due on the following Friday. These will be graded and each will contribute a possible total of 3 points towards your final grade. The questions will include problem solving and basic maths. **Note:** Be careful to distinguish between "Review Questions", "Discussion Questions" and "Problems." I may assign from any of these types, and I will specify which type I am assigning. **Note that a failing grade on the homework component is a failing grade in the course.**

(b) Make sure to show your work and to explain what you are doing. You will receive very little credit if you do not. **Staple** your assignment together to make sure I do not lose any parts of it, and leave space in the margins for graders' comments.

(c) **You may work together on assignments and discuss them with others, but this does not mean that you may copy someone else's work**. The paper that you hand in should be the result of **your own** work, with ideas expressed in your own words and with your own calculations shown. **Violations of this policy are taken very seriously.** Here is an example of the difference: - asking "Does Kepler's third law apply in this situation?" is an acceptable question. However asking "Did you get 5.6 metres as the answer for question 6 when you plugged in 5 for x and 0.6 for y in the equation (x + y)?" is **NOT** acceptable. Throughout the semester, I hope you take the opportunity to talk to your fellow ASTRO 1400 students about the material you are learning, and how to apply it during exams and homework assignments—sometimes the best way to learn something is to hear it more than one way, or to try and explain it to someone else! However, please remember that in the end, your answers and all of your work must be your own. Indeed, you'll want to make sure that you understand the material yourself, for when you walk into the lecture hall to take your exam, you will have no one to help you but yourself!

So remember to learn the material yourself, and don't take credit for something someone else told you. **This also includes copying answers from the book!** Your assignment answers **must** show evidence of being **your own work.** Please remember the following, which is part of the Standard Texas Tech Policies that apply to all of your classes:

Students will foster a spirit of academic integrity, and they will not present work as their own that was not honestly preformed by them. For a complete description of this policy see Texas Tech Operating Policy 34.12.

My general policy is that if a student is found to have copied from someone else's assignment, **BOTH** persons get zero for that assignment, on the first occurrence. A second offence will result in a **fail grade** for the course. If two or more students hand in assignments that are basically the same and then claim that they worked together on the assignment, then the marks for the assignment will be split between the students.

(d) You have **ONE** late assignment slip at the end of this information, which entitles you to a 48-hour extension. If you are handing in a late assignment, you should attach this slip to you assignment and hand it to me **at the start of class** on the following Wednesday! As this is the **only** extension you will be granted for the course, **use it wisely**! Assignments are always due in class ***before*** it begins**; *not in my mailbox; not in campus mail*. If you come to class a little late, hand in the assignment immediately after class so that you do not disrupt the class by walking in front.**

Daytime Labs: There is a **required** laboratory that is part of this course. You will receive one grade for the lecture and laboratory combined—they are not separate courses. For most weeks during the semester you will have a lab during your regularly scheduled lab session. These will be held in Sc 121. If no lab is listed on your schedule, you should see me immediately. You **must attend** the labs in order to get credit (points) for them and all lab work must be turned in to your TA **by you** at the conclusion of each lab. **Work done on your own outside of lab will not be accepted (except for the Lunar Take Home Lab). YOU MUST PASS THE LAB SECTION IN ORDER TO PASS THIS COURSE; REGARDLESS OF YOUR GRADE IN THE LECTURE. LESS THAN 20 IS AN AUTOMATIC FAIL IN Astronomy 1400.**

Night-time Observing sessions: Observing is an important part of astronomy and as such, is an important part of this course. These are in **addition** to your weekly lab meetings in Sc121. These will be held at the Texas Tech Observatory and the Texas Tech Planetarium. All necessary information regarding these activities will be posted on the web site http://www.phys.ttu.edu/~gwen/index.htm or given out in the labs.

Tests: They will emphasize concepts and, to a lesser degree, calculations. You should carefully review your class notes and assignments, as well as the relevant sections of the textbook, before the exam. You may **not** share calculators. Each test will contribute a possible total of 6 points towards your final grade. **No tests may be dropped**. **There will be no make-up for missed tests after one day from the time the test is given.** If possible please let me know early if you are going to miss a test since there is a possibility that you may take the test in advance.

Final Exam: The final exam will cover the entire course and will be held during the normal exam time. However the final will be **optional** for students who have an "**A**" or "**B**" grade at the end of the course. Students with a "C" grade or below **must** take the final.

One last very important point! The showing of pictures and slides is a considerable component of the course. This requires the room lights to be set down low! This can cause some students to feel drowsy. If this happens you can lose much of what is being presented. While I will by trying to watch out for this, you should also take responsibility for staying awake. Remember, this is **YOUR** course, and what you learn from it will depend largely on you.

LATE ASSIGNMENT SLIP

This slip entitles the bearer to one 48 hour extension to an assignment for Astro 1400.

Attach this slip to the assignment and bring it to Professor Clark.

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Course Syllabus

Here is a **tentative** outline of the lecture topics for the term and the associated readings from the textbook. Some modifications may be made depending on how fast we proceed.

	Date	Topic	Weekly Readings	Weekly Assignment
Week 1	W Jan 13 F Jan 15	Introduction. The scale of the Solar System. Ancient Astronomy: Constellations	*The Cosmic Perspective:* Chpt 1 Appendix A. Appendix E. *The Cosmic Perspective:* Chpt 2.1 Appendix I.	
Week 2	M Jan 18 W Jan 20 F Jan 22	University Holiday Ancient Astronomy: Sky motions. Lunar motions;	 *The Cosmic Perspective:* Chpt 2 Appendix C.	Assignment 1 Due Friday Jan 22
Week 3	M Jan 25 W Jan 27 F Jan 29	Eclipses Sky Coordinates. The Geocentric Universe.	*The Cosmic Perspective:* Chpt S1 *The Cosmic Perspective:* Chpt 3	
Week 4	M Feb 1 W Feb 3 F Feb 5	Birth of Modern Astronomy. Kepler's laws. Newton: Gravity: Orbits.	*The Cosmic Perspective:* Chpt 5	Assignment 2 Due Friday Feb 5
Week 5	M Feb 8 W Feb 10 F Feb 12	Light, Radiation, Atoms I. Light, Radiation, Atoms II. Spectroscopy	*The Cosmic Perspective:* Chpt 4.3 *The Cosmic Perspective:* Chpt 6	
Week 6	M Feb 15 W Feb 17 F Feb 19	Telescopes I. Telescopes II. Solar System Overview	*The Cosmic Perspective:* Chpt 7	Assignment 3 Due Friday Feb 19
Week 7	M Feb 22 W Feb 24 F Feb 26	The Sun **1st Mid-term test** The Terrestrial Planets. The Earth-Moon System.	*The Cosmic Perspective:* Chpt 14.2; 14.4; 14.5. *The Cosmic Perspective:* Chpt 9	
Week 8	M Mar 1 W Mar 3 F Mar 5	The Interiors of the Terrestrial Planets. The Surfaces of the Terrestrial Planets I. The Surfaces of the Terrestrial Planets II.	*The Cosmic Perspective:* Chpt 9; Chpt 13.2	Assignment 4 Due Friday Mar 5
Week 9	M Mar 8 W Mar 10 F Mar 12	Atmospheres of the Terrestrial Planets I. Atmospheres of the Terrestrial Planets II. Moons of the Terrestrial Planets.	*The Cosmic Perspective:* Chpt 10 Chpt 13.3	

	Mar 13 - 21	**No Classes** **Mid-term break**		
Week 10	M Mar 22 W Mar 24 F Mar 26	The Jovian Planets: Overview. The Interiors of the Jovian Planets I. **2nd mid-term test.**	*The Cosmic Perspective:* Chpt 11.1; 11.2	Assignment 5 Due Friday Mar 12
Week 11	M Mar 29 W Mar 31 F Apr 2	The Interiors of the Jovian Planets II. Atmospheres of the Jovian Planets I. Atmospheres of the Jovian Planets II.	*The Cosmic Perspective:* Chpt 11.2 *The Cosmic Perspective:* Chpt 11.3; 11.4	
Week 12	M Apr 5 W Apr 7 F Apr 9	Rings of the Jovian Planets I. Rings of the Jovian Planets II. Moons of the Jovian Planets I.	*The Cosmic Perspective:* Chpt 11.6 *The Cosmic Perspective:* Chpt 11.5	Assignment 6 Due Friday Apr 9
Week 13	M Apr 12 W Apr 14 F Apr 16	Moons of the Jovian Planets II. Moons of the Jovian Planets III. Solar System Debris: Pluto and Charon.	*The Cosmic Perspective:* Chpt 11.5 *The Cosmic Perspective:* Chpt 12.5	
Week 14	M Apr 19 W Apr 21 F Apr 23	Solar System Debris: Asteroids. Solar System Debris: Comets. Solar System Debris: Meteors and meteorites.	*The Cosmic Perspective:* Chpt 12.1; 12.2 *The Cosmic Perspective:* Chpt 12.4 *The Cosmic Perspective:* Chpt 12.3	Assignment 7 Due Friday Apr 23
Week 15	M Apr 26 W Apr 28 F Apr 30	**3rd mid-term test.** Origin of the Solar System. Extra-solar Planets.	*The Cosmic Perspective:* Chpt 8 *The Cosmic Perspective:* Chpt 13.4 - 13.6	
Week 16	M May 1	Extra-terrestrial life and the search for ET.	*The Cosmic Perspective:* Chpt S5.3; S5.4	
Week 17	F May 10 7.30 – 10am	**Final Exam**		