

# INTRODUCTION TO THE UNIVERSE

## ASTR 1000 — Spring 2012

<http://www.valdosta.edu/~cbarnbau/personal/>

(then click on "Course Information" and follow the link to ASTR 1000)

### **WE DO NOT USE BLAZEVIEW FOR THIS COURSE**

**Instructor:** Dr Cecilia Barnbaum, PhD      email: [cbarnbau@valdosta.edu](mailto:cbarnbau@valdosta.edu)

**Class Meetings:** T Th 9:30 am to 10:45 am      Jennett Hall 2211

**FINAL EXAM:**      **Thurs 3 May at 10:15 am      Jennett Hall 2211**

**Office Hours:** Nevins Hall 3022      MWTR: 8 am to 9 am and MW: 12:15 pm to 1:00 pm  
or by appointment

**Course Description:** This is a lecture course designed for non-science majors. Topics include light, motion, gravity, formation of the sun and planets, stars, galaxies, cosmology, and celestial phenomena such as eclipses, lunar phases, seasons. Although this is not a math-intensive course, a working knowledge of high-school-level algebra is assumed.

**WARNING:** This course is about concepts, **not** memorization. This is **not** a "flash-card" course. You will need to understand the concepts separately and then put them together to apply these ideas to the world and universe. If you do not like to think, this course is not for you. If you prefer to memorize, this course is not for you. **If you like to be challenged intellectually, this course IS for you.**

**Suggested Text:** *Pathways to Astronomy* by Schneider and Arny      or purchase the *e-book* (see my website)

**Attendance:** Regular attendance in lecture is expected, but not required. Your final grade in this course will depend *only* on your performance on exams.

**Grading Policy:** Your final grade for this course will be based on:

**3 one-hour exams** →      worth **60 %** of your grade  
**Final exam**            →      worth **40 %** of your grade

Your final grade in the course will be based solely on your exam scores, weighted as indicated above, such that:

|            |   |
|------------|---|
| 90 — 100 % | A |
| 80 — 89 %  | B |
| 60 — 79 %  | C |
| 50 — 59 %  | D |
| 0 — 49 %   | F |

Mid-term grades will be posted on the Web. However, at any time if you wish to know your current grade, please come see me.

- Assignments:**
- 1) It is suggested that you **read** the relevant material in the textbook before or after each lecture. Figure out which works best for you. Come ready to ask and answer questions.
  - 2) Every week you will receive a list of **study questions** via my website listed at the top of this page. Although these assignments will NOT be turned in, they will serve as a good check on your comprehension of the material. You are well advised to do these study questions on your own and then discuss them with classmates. Full solutions will be released the following week on the website.
  - 3) I am trying something **NEW** this semester. I am attempting to put my lectures **ONLINE**. I advise you look at the site. The material is mostly the same as in lecture, but you are responsible for it. The site is not yet complete, as I will discuss further in class.

- 4) **You are responsible** for everything discussed during lecture, **whether you are present or not**, including, but not limited to, subject material, extra assignments, announcements of schedule changes and exam time changes.

**Mid-Term Exams:**

**VSU PHOTO ID REQUIRED.** There will be three mid-semester exams, **each worth 20%** of your final grade in this course. These exams will cover the material discussed in lecture, the study questions, and any assigned work.

**Final Exam:**

**VSU PHOTO ID REQUIRED.** The final exam will be **comprehensive**, and is a **required element** for a passing grade in this course. *No one will be exempt from taking this exam for any reason, and no one will be allowed to take the exam at any other time than that scheduled.* **Anyone who misses the final exam for any reason will receive a F in the course.**

**Make-Up Policy:**

**Mid-semester exams:** *severe illness* requiring a local physician's written and signed excuse is the *only* acceptable reason for missing a mid-semester exam. (Note that a doctor's appointment is *not* a valid excuse for missing an exam.) A zero will be given if anything other than severe illness is the cause of missing an exam. **Any student who misses more than one mid-semester exam for any reason will receive a failing grade in the course.** Be warned: almost nothing makes me grumpier than having to write a make-up exam, and so any make-up will be much more difficult than the regular exam and must be taken one day after your return to school.

**If you are an athlete** and have an away-game, **YOU MUST** make arrangements with **me in advance** to make up an exam. **A notice from your coach is not sufficient.** If you do not see me **BEFORE** you leave, your grade for that exam will be 0.

**Final exam:** *no make-up for any reason.*

## **POLICY ON CELL PHONES AND OTHER ELECTRONIC DEVICES**

Cell phones have become a serious disturbance in the classroom. I will strictly adhere to the following rules. Anyone in violation will be removed from the classroom immediately.

- ✦ **Cell phones OFF during lectures (NOT in silent mode).** Text-messaging and other cell phone interactions are distracting to me and to those around you. If you have a very special situation which requires that your phone be on, please see me. *Anyone whose phone goes off during class will be removed immediately. Anyone who uses the phone during class for text-messaging, checking calls, or any other reason will be removed immediately.*
- ✦ **NO CELL PHONES ON OR ABOUT YOUR PERSON during exams.** Access to a cell phone during an exam will be considered an attempt to cheat. *Anyone caught with a cell phone will receive an automatic zero for the exam.* If you must bring a cell phone to class, stash it in your purse or backpack or give it to me.
- ✦ **Bluetooth devices and other electronic connections (ear phones, cd players, etc.) must be removed during class time.** You are NOT required to attend lectures. Therefore, if you choose to come to class you are expected to pay attention.
- ✦ **NO LAPTOP COMPUTERS OR PADS IN THE CLASSROOM.** It has been my experience that most students who bring lap tops or pads to class use them to browse the internet which is distracting to those around you. Please remember that attendance is NOT required. If you choose to attend class, you are expected to pay attention. If you want to browse the internet do it outside of class time. Be advised that a very important part of class notes is the drawing of diagrams and pictures, which is usually more time consuming, if not impossible, on a computer than on a piece of paper.

**What I expect from you:**

- ✦ **Come to lecture on time.** Lectures will start on time. Students arriving late create a serious disruption to the class. If you happen to arrive late, please **use the side or rear doors** and have the courtesy to take the first chair you find. I do not abide bad manners.
- ✦ **When you come to lecture, stay the whole time.** Some students think it is ok to wander in and out of lecture to use cell phones or the restroom. It is not ok. It is disruptive. If you must leave the room, **do not come back in.** Use the restroom facilities before lecture begins. If this poses a problem due to a health condition, please see me as soon as possible.
- ✦ **Ask questions in class!** If you have a question, most likely half the class has the same question, too! Any question asked honestly is a *good* question.

- ✦ **Treat your classmates and me with respect.** Students in the past have complained repeatedly about chatting that goes on during lecture. Although I want you to enjoy the course and have fun learning the material, talking and laughing distract me and disrupt the concentration of those around you. Therefore, it will not be tolerated. **The second time in a given lecture that the same student's disruptive behavior causes me to stop class, the student will be dismissed from the rest of the lecture.** If the behavior continues during subsequent classes, I will withdraw the student from the course.
- ✦ **Do your best! It's up to you!** When you pay your tuition, you have not purchased an education, but rather you have paid for an opportunity. The responsibility for what you choose to do with that opportunity rests with you alone.
- ✦ **Put in the time!** For every hour in the classroom, you should put in at least 2 hours study time outside class. We meet for 3 hours per week, so you should plan on putting in at least 6 hours of study time per week. The attempt to cram for 48 hours before an exam will not work. If your load is too heavy to allow you the study time you need, drop this class.

**What you can expect from me:**

- ✦ I start lectures on time and will not keep you over-time.
- ✦ I treat students with respect and understanding.
- ✦ My lectures are well prepared and organized.
- ✦ I grade exams immediately and get them back to you the following class meeting time.
- ✦ I provide regular out-of-class review sessions for those interested.
- ✦ My office door is always open to you.

**Assistance:**

If you find yourself a bit confused by the course material, please get help as soon as possible. We have a **TUTORING SERVICE FREE OF CHARGE and also a teaching assistant, Brian Shanken, assigned to our class (refer to the Success Center)**. Also, come to my office hours or make an appointment with me. As long as it is clear to me that you are making a Herculean effort, I will spend as much time with you as it takes to get you through this course. But it is UP TO YOU.

**Suggestions for doing well in this course:**

**Don't fall behind!** Learning a science is **not** memorizing! Learning a science is learning concepts, and it takes time for concepts to sink in. Therefore, you cannot cram for astronomy exams! **TAKE NOTES IN LECTURE!** Learning is an **ACTIVE** process, not a passive one. If you keep up consistently, you will do well.

What does "keep up" mean? It means:

- doing the **study sheets** *before* the answers are released
- doing the **reading** either before or right after lecture
- going over **lecture notes**, and figuring out what you *do not* understand!

The key to doing well in science is finding out *what does not make sense* to you. Once you figure that out, filling in the missing pieces is easy. Figuring out what you don't know is the hardest part. For most of you, this is a different studying technique.

One very effective way to find out what you don't know is to take turns explaining concepts to classmates or even friends outside class. When you try to teach someone else an idea you will find out where the holes are in your own understanding!

**Academic Integrity:**

**Cheating and attempting to cheat are absolutely unacceptable. The first offense will result in a failing grade in this course and prosecution toward being expelled from the University System of Georgia.** Don't test the fences on this one.

**Students with Disabilities:**

Students requiring accommodations because of a **documented disability** should discuss this need with me at the beginning of the semester, and I will do everything possible to make reasonable adjustments. Disabled students who are not registered with the Special Services Program should contact the Access Office at (229) 245-2498.

Departmental Selected Outcomes: 1, 2, 4

VSU General Education Outcomes: 3, 5, 7

# Schedule of Lecture Topics

(subject to change as necessary)

| week #                             |                | General Topic  | Textbook Units*                    |
|------------------------------------|----------------|--|------------------------------------|
| 1                                  | 10 Jan         | T Introduction to the Universe   | 1; 2.1–2.4                         |
|                                    | 12             | Th Our Cosmic Address — Getting Oriented with the Evening Sky              | 3.2; 5.1 – 5.4                     |
| 2                                  | 17             | T Motion of Earth and the Planets  | 6; 10; 11                          |
|                                    | 19             | Th Motion of the Planets   | 13.1 – 13.4; 14                    |
| 3                                  | 24             | T Lunar Phases, Lunar and Solar Eclipses                                   | 8.1 – 8.2; 10                      |
|                                    | 26             | Th Nature of Motion  | 15; 16; 18; 19                     |
| 4                                  | 31             | T REVIEW   |                                    |
|                                    | 2 Feb          | Th <b>EXAM #1</b>  |                                    |
| 5                                  | 7              | T Four Fundamental Forces of Nature / Ups and Downs of Gravity             | 21; 22; 23                         |
|                                    | 9              | Th Energy, Power, Temperature and Heat                                     | 27.1–27.2; 28.1–28.2;<br>29.1–29.2 |
| 6                                  | 14             | T The Origin of the Solar System / Light in the Darkness                   | 32; 33; 34                         |
|                                    | 16             | Th Telescopes  | 49; 51                             |
| 7                                  | 21             | T The Structure of Matter  | 4.2–4.4; 50                        |
|                                    | 23             | Th The Sun, Our Star / Spectroscopy  | 24, 25; 52.2; 54; 55               |
| 8                                  | 28             | T Review   |                                    |
|                                    | 1 Mar          | Th <b>EXAM #2</b>  |                                    |
| <b>Th 1 Mar — LAST DAY TO DROP</b> |                |  |                                    |
| 9                                  | 6              | T Stars and their Spectra / Stellar Distances and Populations              | 58; 59                             |
|                                    | 8              | Th "Life" and "Death" of Stars: Supernovae, and Neutron Stars; Cosmic Rays | 61; 62; 64                         |
| <b>10</b>                          | <b>12 – 16</b> | <b>Spring Break</b>  |                                    |
| 11                                 | 20             | T Black Holes / Special and General Relativity                             | 53.3 – 53.5; 66; 67; 68            |
|                                    | 22             | Th Structure of the Milky Way and the ISM                                  | 63.3; 69; 70; 71;<br>72; 73        |
| 12                                 | 27             | T Galaxies / The Universe — How Big, How Far                               | 74; 75; 79; 80; 81; 82             |
|                                    | 29             | Th The Universe — Past and Future  | 76; 78                             |
| 13                                 | 6 Apr          | T Review   |                                    |
|                                    | 5              | Th <b>EXAM #3</b>  |                                    |
| 14                                 | 10             | T Mercury and Our Moon   | 37; 38                             |
|                                    | 12             | Th Earth, Venus and Mars   | 38; 39; 40                         |
| 15                                 | 17             | T The Gas Giants   | 43; 44; 45                         |
|                                    | 19             | Th Asteroids, Comets and Pluto, Wanderers in the Solar System              | 46; 47; 48                         |
| 16                                 | 24             | T Possibility of Extraterrestrial Life                                     | 83; 84                             |
|                                    | 26             | Th REVIEW FOR FINAL EXAM   |                                    |

\* **Note:** Your textbook is written and designed to be read by topic rather than in numerical order.