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ASTR 132N.01: Elementary Astronomy II

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PROFESSOR: Dr. Alex Bulmahn
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EMAIL: alexander.bulmahn@umontana.edu
LECTURE: TR 9:40-11:00 am, 101 Urey Lecture Hall
OFFICE HOURS: M 1-2:30, T 11-12, W 10:30-11:30, *and by appointment*
COURSE WEBSITE: Course materials will be posted on the Moodle site for the course

Overview: In this course we will study our amazing and dynamic universe. The material that we will cover in this course will take us from the small scale of fundamental particles to the large scale of the evolution of our universe. We will learn about many fundamental processes in nature, see how those processes fit into the larger picture, and learn how astronomers piece all of it together.

Learning Objectives: Upon completion of this course you should have gained an understanding:

- that the universe is dynamic.
- of fundamental physical properties and phenomena.
- the fact that universe is knowable through the process of science.
- the universality of physical laws.

Required Materials: You will need the following materials for the course:

- *The Cosmic Perspective, 7th edition* by Bennett, Donahue, Schneider, Voit (custom edition for U of M available at the bookstore)
- Access to *Mastering Astronomy*, the online homework system we will use in this course

Expectations: This is a university science course for non-science majors and it will be taught at that level. The use of mathematics will be necessary for understanding some of the topics that we will cover, like it is in any science course. The mathematics we will use in this course are algebra and geometry at the high-school level. We will certainly review these concepts throughout the year if you are rusty.

Attendance, while not mandatory, is highly recommended. Homework and exam questions will be based off of the material that is presented in lecture.

To be successful in this class, time will need to be spent outside of lecture reviewing information from the course. It is highly recommended that you keep up with the reading assignments that are posted on the schedule to gain a better understanding of the concepts being presented in lecture. Weekly homework assignments also make up a large portion of your overall grade. These assignments will usually take 2-3 hours to complete so don't wait until the last minute to start your homework. Remember that at the UM, one "unit" represents 3 hours of work by the student including class time. Being a three unit course, you can expect to put around 10 hours per week into the course to be successful.

Grading: Your grade for the course will be based on weekly homework assignments, two in-class midterm exams, and a final exam. **Late homework will not be accepted and make-up exams will only be given in extreme circumstances.** The grading for the course will be broken down as follows:

Homework:	25%
Midterm Exams:	45% (22.5% each)
Final Exam:	30%

The letter grades in this course will be based on a curve, giving you the grade that you earn. The curve will be determined by the performance of the class as a whole, but I do not have a set number of A's, B's, etc. predetermined. *Note: the last day to add or drop the course via Cyberbear is February 14th. The last day to drop without the Dean's signature is April 7th.*

Course Etiquette: This is a large lecture environment. In order to keep the environment conducive for learning please:

- arrive on time. Lectures will begin promptly at 9:40.
- do not start packing your things early, this can be very distracting to other students. I will not keep you late and lectures will end by 11:00.
- keep cell phones set to vibrate, silent, or off and keep them put away throughout the lecture. I promise that you will get more out of the course if you do not spend lecture time texting and updating your facebook page.

Academic Honesty: All students must practice academic honesty. Academic misconduct is subject to penalty by the course instructor and/or disciplinary sanction by the University. All students need to be familiar with the Student Conduct Code. The Code is available for review online at http://life.umt.edu/vpsa/student_conduct.php.

Students with Disabilities: Whenever possible, and in accordance with civil rights laws, The University of Montana will attempt to provide reasonable modifications to students with disabilities who request and require them. Please feel free to setup a time with me to discuss any modifications that may be necessary for this course. For more information, visit the Disability Services for Students website at <http://life.umt.edu/dss/>.

Complaint Procedure: If anyone is having issues with the way that the course is being taught or the way that material is being presented I hope that you will come to me first to express your concerns. If you feel that you cannot come to me with these issues you can contact the chair of the department, Dr. Dan Reisenfeld, 130 CHCB.

Registering for *Mastering Astronomy*

1. Go to www.masteringastronomy.com
2. Click the STUDENT link under REGISTER

If you have purchased an access code

3. Click the button for yes, I have an access code and accept the licensing agreement
4. Create a User Name and Login that you will use for the rest of the semester
5. Enter your Mastering Astronomy access code
You may need the schools zip code which is 59812
6. Complete the registration

If you have not purchased an access code

3. Click the button for no, I need to purchase online access now
4. Choose the course text, *The Cosmic Perspective, 7th edition*, Bennett/Donahue/Schneider/Voit
5. Decide if you want the etext or not
6. Follow the steps above
7. Login to Mastering Physics
8. Join the course using the Course ID— **MABULMAHN23459**

Schedule:

Week	Dates	Topic	Reading
1	1/27—31	Course Introduction	
		The Night Sky	Etext: 2.1
2	2/3—7	Motion and Newton's Laws	1.1, 1.2 (Etext: 4.1, 4.2)
		Gravity and Orbits	1.4, 1.5 (Etext: 4.4, 4.5, pp 66-67)
3	2/10—14	Space Travel and Special Relativity	pp. 85-103, Etext: 24.5
		Matter and the Standard Model	2.3, pp 131-136 (Etext: 5.3, S4.1, S4.2)
4	2/17—21	Energy and Light	1.3, 2.1, 2.2 (Etext: 4.3, 5.1, 5.2)
		Learning from Light	2.4, 2.5 (Etext: 5.4, 5.5)
5	2/24—28	Telescopes	Ch. 3 (Etext: Ch. 6)
		The Sun	Ch. 4 (Etext: Ch. 14)
6	3/3—7	Midterm Exam #1	Bring a Scantron to class
		Introduction to Stars	Ch. 5 (Etext: Ch. 15)
7	3/10—14	Star Formation	Ch. 6 (Etext: Ch. 16)
		Exoplanets	Etext: Ch. 13
8	3/17—21	Habitable Planets and Life in the Universe	Etext: 24.3, 24.4
		Low Mass Star Evolution	7.1, 7.2 (Etext: 17.1, 17.2)
9	3/24—28	High Mass Star Evolution	7.3 (Etext: 17.3)
		Compact Objects: White Dwarves and Neutron Stars	8.1, 8.2 (Etext: 18.1, 18.2)
10	3/21—4/4	SPRING BREAK	Relax and Recharge
11	4/7—11	Black Holes and Einstein's Gravity	8.3, pp. 108-127 (Etext: 18.3, S3)
		The Milky Way	9.1-9.3 (Etext: 19.1-19.3)
12	4/14—18	Our Galactic Center, Supermassive Black Holes, and Quasars	9.4, 11.3 (Etext: 19.4, 21.3)
		Galaxies	10.1, 11.1, 11.2 (Etext: 20.1, 21.1, 21.2)
13	4/21—25	Midterm Exam #2	Bring a Scantron to class

		Hubble and the Expanding Universe	10.2, 10.3 (Etext: 20.2, 20.3)
14	4/28—5/1	Dark Matter	13.1-13.3 (Etext: 23.1-23.3)
		The Big Bang and the Early Universe	12.1-12.3 (Etext: 22.1-22.3)
15	5/5—9	The Fate of the Universe and Dark Energy	13.4 (Etext: 23.4)
		String Theory	
16	5/12—16	Finals Week Final Exam, Thursday 5/15 8:00-10:00 am	Exam in 101 Urey Lecture Hall