Spring 2-1-2016

ASTR 132.01: Stars, Galaxies and the Universe

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ASTR 132N: Stars, Galaxies, and the Universe Spring 2016

PROFESSOR:	Dr. Alex Bulmahn
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LECTURE:	TR 9:40-11:00 am, 101 Urey Lecture Hall
OFFICE HOURS:	T 11-12, W 1-2, F 11-12, and by appointment
TEXTBOOK:	*21ST Century Astronomy,* by Kay et al.
COURSE WEBSITE:	Course materials and grades will be posted on Moodle

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 and 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

- Access to *SmartWork*, the online homework system that will be used for 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:	30%
Midterm Exams:	20% each (40% total)
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 drop the course via Cyberbear is February 12th. The last day to drop the course without the Dean's signature is March 28th.*

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.

Registering for *SmartWork*

- Purchase a registration code at the Norton Publishing site (http://wwnorton.com/buysmartwork). The text is *21ST Century Astronomy,* by Kay et al.
- Go to the SmartWork website (http://smartwork.wwnorton.com) and create a SmartWork account following the online instructions.
- Login to SmartWork, enter the registration code you purchased and join the course using the course ID ASTRO4E9816.

Course Guidelines and Policies

Student Conduct Code

The Student Conduct Code at the University of Montana embodies and promotes honesty, integrity, accountability, rights, and responsibilities associated with constructive citizenship in our academic community. This Code describes expected standards of behavior for all students, including academic conduct and general conduct, and it outlines students' rights, responsibilities, and the campus processes for adjudicating alleged violations. Full student conduct code. (http://www.umt.edu/vpsa/policies/student_conduct.php)

Disability Modifications

The University of Montana assures equal access to instruction through collaboration between students with disabilities, instructors, and Disability Services for Students. https://www.umt.edu/dss/default.php If you think you may have a disability adversely affecting your academic performance, and you have not already registered with Disability Services, please contact Disability Services in Lommasson Center 154 or call 406.243.2243. I will work with you and Disability Services to provide an appropriate modification.

Tentative Schedule

Week	Date	Topic	Reading and Notes
1	1/26	Course Introduction, The Night Sky	2.1—2.3
	1/28	Planetarium	**Sign-up for a time**
2	2/2	Planetarium	**Sign-up for a time**
	2/4	Motion and Newton's Laws	3.5
3	2/9	Gravity and Orbits	3.1—3.3, 4.1—4.2
	2/11	Matter and Energy	
4	2/16	Light	Ch. 5
	2/18	Learning from Light	Ch. 5
5	2/23	Telescopes	Ch. 6
	2/25	**Midterm Exam #1**	
6	3/1	Introduction to Stars	Ch. 13
	3/3	The Sun	Ch. 14
7	3/8	Star Formation	Ch. 15
	3/10	Exoplanets	Ch. 7
8	3/15	Habitable Planets and Life in the Universe	Ch. 24
	3/17	Low Mass Star Evolution	Ch. 16
9	3/22	High Mass Star Evolution	Ch. 17
	3/24	White Dwarves and Neutron Stars	
10	3/29	Black Holes and Einstein's Gravity	Ch. 18
	3/31	Galaxies	20.1—20.2
11	4/4—8	**SPRING BREAK—NO CLASS**	

12	4/12	The Milky Way	21.1, 21.3
	4/14	Our Galactic Center, Supermassive Black Holes	20.4, 21.4
13	4/19	**Midterm Exam #2**	
	4/21	Hubble and the Expanding Universe	19.1—19.3
14	4/26	Dark Matter	20.3, 21.2, 23.2
	4/28	The Big Bang and the Early Universe	19.4—19.6
15	5/3	The Fate of the Universe and Dark Energy	Ch. 22
	5/5	Open Questions in Astronomy	
16	5/9—13	**Final Exam 8:00-10:00 am, Wednesday 5/11**	**Exam in 101 Urey Lecture Hall**