

SYLLABUS
Astronomy 170B1, Lecture #4
The Physical Universe
Spring 2018

LECTURES:	Monday/Wednesday/Friday: 12:00 p.m. – 12:50 a.m. Steward Observatory, Room N210 (<u>No Class on Jan 15</u>)	
BREAKOUT SECTIONS:	Selected Fridays: 12:00 p.m. – 12:50 p.m. SO N210, SO 202, SO 204	
INSTRUCTOR:	Dr. Xiaohui Fan	
OFFICE:	Steward Obs. Room 340	
TELEPHONE:	(520) 626-7558	
EMAIL:	fan@as.arizona.edu	
OFFICE HOURS:	Tue 11:00am – 12 noon; Thu 11:00am – 12 noon	
TEACHING ASSISTANTS:	Stefan Evans Email: evanss@email.arizona.edu Office for Hrs: Physics & Atmospheric Science Building, Room 376 Office Hrs: Monday 2:00pm – 3:00pm, Wednesday 2:00 pm – 3:00pm	
MIDTERMS:	Friday, Feb 16, 12pm Monday, Apr 2, 12pm	
FINAL EXAM:	Wednesday, May 9, 10:30am – 12:30pm	
REQUIRED TEXTBOOK:	<i>The Cosmic Perspective, 8th Ed.</i> with <i>Mastering Astronomy</i> website	by Jeffrey Bennett, Megan Donahue, Nicholas Schneider, & Mark Voit
WEBSITES:	https://d2l.arizona.edu/ http://www.masteringastronomy.com [Class Code: MAFAN2018A]	

REQUIRED TEXT: The textbook named above is required for the course. You also have the option of purchasing the eText of this book; see last page for instructions. You are responsible for the material in the text, whether covered in class or not. Later in this syllabus, we tell you which chapters correspond to the lectures given each week. You are required to read those chapters before coming to class that week.

COURSE DESCRIPTION: The Physical Universe is a survey of modern astronomy. Astronomy is a field studying the properties of a wide range of objects in the observable universe, across enormous scales in both space and time: from our Earth and Moon, our Solar System, other distant planets, to stars, galaxies, black holes, and the Big Bang

itself. In addition, we will use modern astronomy as a tool to study how science works: the nature and the process of scientific discovery and scientific progress. This course is a Tier One General Education Course in the area of Natural Sciences.

COURSE OBJECTIVES: We hope that by the end of this course, you will be familiar with many areas of astronomy to the extent of being able to understand the context of the astronomical research and discoveries that you read in media, magazines and popular science books. You will be able appreciate how astronomy touches and affects your daily life, such as the seasons, lunar phases, eclipses. But the most important goal of this class is for you to understand scientific method and how we gain our knowledge of the universe through scientific reasoning and discovery. This, we hope, will help you to have a deeper understanding of the roles of science and technology in our society, and gain insight into the many important discussions and debates related to science and technology in our model life.

INSTRUCTION STRUCTURE: This course will meet on Mondays and Wednesdays, and on selected Fridays for general lectures. On other Fridays, it will be divided into two or three breakout discussion and laboratory sections. We will try to be interactive in our lectures, and strongly encourage you to interrupt, ask questions, and debate on important and controversial points. The laboratory sections will involve small group work, and you are expected to interact with the instructors and with your peers, to learn from each other, and to report to the class on those activities.

MAKE-UP POLICY: We do not give make-up exams. We will give 2 midterm exams, but only the higher of the two scores will count towards your final grade. If you miss an exam, the score of that exam will be dropped. Also, please note that the final exam is scheduled for May 9. Take this into account when making travel plans in December. Your desire to go home earlier May 9 **will not** be accepted as a valid excuse. You are required to be here on May 9.

ALL EXAMS are closed book and closed note. All phones & pagers must be packed away and hidden from view!
If you are seen with a phone/WiFi-enabled device in your hand during an exam, you will fail the exam!

GRADES: Your final grade for the course will be based on the midterm and final exams and other assignments in the following proportion:

Midterm Exam	200 points (20%)
Final	200 points (20%)
MA Assignments	200 points (20%)
Friday Lab Activities	150 points (15%)
Wring Assignments	150 points (15%) + bonus up to 50 points
Quiz /Attendance	100 points (10%)

All questions, disputes, or mistakes regarding the grading of exams and assignments must be brought to our attention within 1 week after the exam or assignment is handed back or posted.

These are the hardest percentages needed to earn a specific grade. We reserve the right to curve the class further, making the grading slightly easier.

A = 850 points (85%)
B = 750 points (75%)
C = 600 points (60%)
D = 500 points (50%)
E < 500 points

ACTIVITIES/HOMEWORK: We will conduct a series of lab activities on Fridays which will include homework. The first breakout activity is on Friday Jan 26. Please see your breakout group assignment on the D2L website. Additional homework sets will also be assigned from *Mastering Astronomy*. It is our policy that you may work together on Friday activity homework problems with two other persons, i.e. no more than three (3) people working together. If you do choose to work with someone else, hand in only one set of answers and put both of your names at the top. You will both receive the same grade. This policy does not apply to *Mastering Astronomy* assignments. Late homework will not be accepted.

WRITING ASSIGNMENTS: Throughout the semester, you will be required to write 3 essays based on news stories or other topics involving astronomy and space science. Each issue will at least 3-4 pages long. We will hand out detailed instructions later. You will receive feedback on one of these essays. In addition, exceptional essays will receive bonus points.

QUIZZES: We will not take attendance every class. We will have six unannounced in-class quizzes spread over the semester. These will be simple multiple choices questions (~5 in each quiz) that cover important points in the class. We will drop your lowest score on the quiz, so only the top five will be counted in your grade. Note that these quizzes will also be a good reference when you prepare your exams, so please pay attention!

FLASH CARDS: We will hand out flash cards that will be used extensively in the class for discussions and instant polls. Please bring them to every class and don't lose them (we will have extras if you do misplace them).

CLASSROOM ETIQUETTE: In order to provide an environment conducive to learning and interaction, the following policies will be followed:

- No eat or drinking (other than water) in the classroom
- Cell phones must be turned off and out of sight
- Laptops and tablets may be used for note taking. Other activities that distract you from the course will not be tolerated.
- Late arrivals and departures are strongly discouraged.

CLASS COMMUNICATIONS: In addition to formal classes and office hours, please check the D2L website frequently for updates, news, grades etc. All the important announcements will be made both in class and on the D2L website, and be sent to your student email addresses. Since all assignments and announcements will be made both in class and on the website, we do not accept "I didn't see the announcement" as an excuse for missing or late assignment, activity, or exam.

LEARNER-CENTERED EDUCATION: The University of Arizona has designated itself a "Learner-Centered University." This means that the student is expected to take an active role in his/her learning. We intend to conduct this course in accordance with these principles. Do not expect us to lecture for the entire class period while you sit, listen, and take notes. Class time will be peppered with "mini-lectures," separated by various activities which will make use of the responders. Be prepared to interact with your classmates, ask questions, and participate in group discussions. You will also interact with computer-generated animations and exercises. Our goals for you in this course are that, after it is over, you will have an appreciation for what science is and is not; you will be familiar with basic astronomical terminology and some of the results of scientific research in the field; you will have a sense of the scale of the Universe and our place in it; and you will have exercised your critical thinking and problem solving skills. We ask that you participate fully in the course. In return, we promise to make this course as interesting and fun for you as we can.

DEADLINES: We will accept no late assignments. You will be given at least one week to complete an assignment. If you choose to wait until a few hours before the deadline to do your assignment, you are taking a calculated risk. Should your printer break, Internet go down, or an emergency arise, these will not be valid excuses. You will not get an extension because you chose to wait until the last moment to start the assignment. If this worries you, start your assignments early and hand them in early!! You can submit an assignment to us any time before the deadline.

ACADEMIC DISHONESTY: Presentation of any work other than your own is considered academic dishonesty. This includes copying test answers or homework assignments, other persons taking exams for you, or reference to any unauthorized materials during the exam. Any other technique that gains unfair advantage over other students is also considered academically dishonest. All students must be prepared to present valid picture identification if requested during an exam period. Any incidents of academic dishonesty will be dealt with according to the University of Arizona's Code of Academic Integrity. A copy of this Code can be obtained at the Dean of Students website:

<http://deanofstudents.arizona.edu/codeofacademicintegrity>

The consequences can range from loss of credit on an assignment to dismissal from the University, depending on the severity of the offense. In our class, the penalty for plagiarism, cheating on an exam, or responder/computer fraud will be automatic failure of the course and, depending on the circumstances, we may seek your suspension or expulsion from the University.

You should also be aware of the University's policies on disruptive and threatening behavior:

<http://deanofstudents.arizona.edu/disruptiveandthreateningstudents>

TURNITIN.COM: If you decide to take and continue in this course, you are agreeing to submit your essays online to a plagiarism-prevention program called TurnItIn.com. You should note that TurnItIn.com – always without your name and any personal information – will retain your paper as part of their database so that students who plagiarize from it can be detected. Because of this program, the vast majority of you who do your own work and cite your sources of information properly will not have to compete with students who commit undetected plagiarism. Anyone who has questions or problems with TurnItIn.com may talk privately about these with Dr. Fan.

STUDENTS WITH DISABILITIES: If you anticipate issues related to the format or requirements of this course, please meet with Dr. Fan. I would like us to discuss ways to ensure your full participation in the course. If you determine that formal, disability-related accommodations are necessary, it is very important that you be registered with Disability Resources (621-3268; <http://drc.arizona.edu>) and notify me of your eligibility for reasonable accommodations. We can then plan how best to coordinate your accommodations.

LECTURE, ACTIVITY and EXAM SCHEDULE (subject to change)

01/10 (W): Lecture 1. Introduction. The Universe, Chap 1

01/12 (M): Lecture 2. Night Sky, Season, Chap 2.1,2.2

01/15 (M): MLK holiday, no class

01/17 (W): Lecture 3. Moon, Planets, Chap 2.3, 2.4

01/19 (F): Planetarium Show, meet at Flandrau entrance (TBC)

01/22 (M): Lecture 4. History of Astronomy, Chap 3.1, 3.2, 3.3

01/24 (W): Lecture 5. The Nature of Science, Chap 3.4, 3.5

01/26 (F): *Breakout 1. Nature of Science; MA homework 1 due;*

01/29 (M): Lecture 6. Motions, Chap 4.1, 4.2

01/31 (W): Lecture 7. Gravity, Chap 4.3, 4.4, 4.5

02/02 (F): Lecture 8. Light, Chap 5.1, 5.2

02/05 (M): Lecture 9. Energy and Matter, Chap 5.3, 5.4

02/07 (W): Lecture 10. Telescopes, Chap 6

02/09 (F): *Breakout 2. Spectroscopy; MA Homework 2 due*

02/12 (M): Lecture 11: Solar system, Chap 7.1, 7.2

02/14 (W): Lecture 12. Terrestrial Planets, Chap 9.1 9.2

02/16 (F): Midterm 1

02/19 (M): Lecture 13. Jovian Planets, Chap 11

02/21 (W): Lecture 14. Asteroids. Comets, Dwarf Planets, Chap 12

02/23 (F): *Breakout 3. Mars*

02/28 (W): Lecture 15. Other Planetary Systems, Chap 13

03/02 (F): Lecture 16. Sun Chap 14

03/04 (M): Lecture 17. Stars, Chap 15.1; MA Homework 3 due; Essay 1 due

Spring Break

03/12 (M): Lecture 18. H-R Diagram, Chap 15.2, 15.3;

03/14 (W): Lecture 19. Star Birth, Chap 16

03/16 (F): *Breakout 4. HR Diagram;*

03/19 (M): Lecture 20. Live of stars, Chap 17.1, 17.2, 17.3

03/21 (W): Lecture 21, Star Death, Chap 18.1, 18.2;

03/23 (F): Lecture 22, Black Holes, Chap 18.3; MA homework 4 due

03/26 (M): Lecture 23. The Milky Way, Chap 19.1, 19.2

03/28 (M): Lecture 24. Galactic Center, Chap 19.4

03/30 (F): Breakout 5. Galaxies

04/02 (M): Midterm 2

04/04 (W): Lecture 25. Galaxy Properties, Chap 20.1

04/06 (F): Lecture 26. Distance and age of the universe, Chap 20.2, 20.3; Essay 2 due

04/09 (M): Lecture 27. Galaxy Evolution, Chap 21.1, 21.2

04/11 (W): Lecture 28. Quasars; MA homework 5 due

04/13 (F): Special Lecture: Relativity

04/16 (M): Special Lecture: Gravitational Wave

04/18 (W): Lecture 29: Big Bang, Chap 22.1, 22.2

04/20 (F): *Breakout 6. Big Bang;*

04/23 (M): Lecture 30: Inflation, Chap 22.3, 22.4

04/25 (W): Lecture 31: Dark Matter, Chap 23,1, 23,2

04/27(F): Lecture 32: Dark Energy, Chap 23.4;

04/30 (M): Lecture 33. Life in the Universe, 24.1, 24.3

05/02 (W): Lecture 34. Summary, Final Review; MA homework 6 due; Essay 3 due

05/09 (W): Final

INSTRUCTIONS FOR OPENING AN ACCOUNT ON *MASTERING ASTRONOMY*

1. Go to <http://www.masteringastronomy.com>
2. Click on the “Students” button in the box labeled “OK! Register Now”.
3. Enter your course ID: **MAFAN2018A**
4. Create a Person account, follow instructions
5. When you register, use the access code provided in your textbook
6. If you bought a used textbook and do not have the access code, you have the option to purchase one at this point.
7. During the next stage of registering, you will need to enter your University of Arizona Net ID number.
8. Go to the homepage, you should see one assignment, called “Introduction to Mastering Astronomy”. This is for you to practice. Please try it out and make sure that it works. It will not be counted in the grade.
9. The first assignment will be available next week.

If you have REGISTRATION questions: contact <http://247pearsoned.custhelp.com/> and fill out the request form for help.

If you have Mastering Astronomy questions: contact support@masteringastronomy.com or refer to the online help documents.