

**SYLLABUS**  
**Astronomy 170 B1 - The Physical Universe**  
**Fall 2016**  
**Dr. Jinyoung S. Kim**

**LECTURES:** Tuesday/Thursday: 9:30 a.m. – 10:45 a.m. (Section 4)  
Steward Observatory, Room N210 (**No Class on Nov 24 – Thanksgiving Day**)

**ACTIVITY SESSIONS:** Selected Thursdays: 9:30 a.m. – 10:45 a.m.  
SO N210 (Kim)  
SO N208 (Mr. Ashmaram)  
SO N202 (Mr. Spilker)

**INSTRUCTOR:** Dr. Jinyoung Serena Kim  
**OFFICE:** Steward Obs. Room N330 (Note: N in front of office number)  
**TELEPHONE:** (520) 626-0187  
**EMAIL:** [serena00@email.arizona.edu](mailto:serena00@email.arizona.edu)  
**OFFICE HOURS:** Mondays 10 a.m. – 11 a.m. and Thursdays 1:30 p.m. – 2:30 p.m.

**TEACHING ASSISTANTS:** Mr. Ashoordin Ashmaram  
Email: [ashoormaram@email.arizona.edu](mailto:ashoormaram@email.arizona.edu)  
**TELEPHONE:** 520-621-6523  
**OFFICE:** SO D223 (in the white dome building)  
**OFFICE HOURS:** Mondays: 11 a.m. – 12 p.m. and Wednesdays 3:00 p.m. – 4:00 p.m.

**TEACHING ASSISTANTS:** Mr. Justin Spilker  
Email: [jspilker@email.arizona.edu](mailto:jspilker@email.arizona.edu)  
**TELEPHONE:** 520-621-2589  
**OFFICE:** SO D317 (in the white dome building)  
**OFFICE HOURS:** Tuesdays 2 p.m. – 3 p.m. and Thursdays 11 a.m. – 12 p.m.

**MIDTERMS:** Tuesday, September 27, 9:30 a.m. at N210  
Tuesday, November 1, 9:30 a.m. at N210  
**FINAL EXAM:** Tuesday, December 13, 8:00 a.m. – 10:00 a.m. at N210

**REQUIRED TEXTBOOK:** *The Cosmic Perspective, 8<sup>th</sup> Ed.* by Jeffrey Bennett, Megan Donahue,  
with *Mastering Astronomy* website Nicholas Schneider, & Mark Voit

**WEBSITES:** <http://D2L.arizona.edu>  
<http://www.masteringastronomy.com> [Class Code: **MAKIM16B**]

**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. Reading assignments for next lectures will also be posted in the D2L. You are required to read those chapters before coming to class that week. When I update this syllabus, I will post the updated version in the course D2L site. Make sure you check D2L frequently.

**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 modern life.

**INSTRUCTION STRUCTURE:** This course will meet on Tuesdays and Thursdays for general lectures. On some selected Thursdays the class will be divided into groups of 2-3 students for activities. We will try to be interactive in our lectures, and I strongly encourage you to interrupt, ask questions, and debate on important and controversial points. The activity 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.

**ABSENCE AND CLASS PARTICIPATION POLICY:** The UA's policy concerning Class The UA's policy concerning Class Attendance, Participation, and Administrative Drops is available at <http://catalog.arizona.edu/policy/class-attendance-participation-and-administrative-drop>

The UA policy regarding absences for any sincerely held religious belief, observance or practice will be accommodated where reasonable: <http://policy.arizona.edu/human-resources/religious-accommodation-policy>. Absences preapproved by the UA Dean of Students (or dean's designee) will be honored. See <http://policy.arizona.edu/employmenthuman-resources/attendance>.

Participating in the course and attending lectures and other course events are vital to the learning process. As such, attendance is required at all lectures and discussion section meetings. Students who miss class due to illness or emergency are required to bring documentation from their health-care provider or other relevant, professional third parties. Failure to submit third-party documentation will result in unexcused absences.

**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 December 13. Take this into account when making travel plans in December. Your desire to go home earlier than Dec. 13 will ***not*** be accepted as a valid excuse. *You are required to be here on Dec. 13 (8 a.m.-10 a.m.). There will be NO-make up exam.*

ALL EXAMS are closed book and closed note. All phones & other electronic devices 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%)
Thursday Activities	150 points (15%)
Writing 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 = 880 points (88%)**  
**B = 750 points (75%)**  
**C = 600 points (60%)**  
**D = 500 points (50%)**  
**E < 500 points**

We will complete at least 40% of the grade-points by the end of the 8<sup>th</sup> week of classes (or equivalent for longer or shorter terms). **Requests for incomplete (I) or withdrawal (W)** must be made in accordance with University policies, which are available at <http://catalog.arizona.edu/policy/grades-and-grading-system#incomplete> and <http://catalog.arizona.edu/policy/grades-and-grading-system#Withdrawal> respectively

**ACTIVITIES (LABS):** We will conduct a series of lab activities on some Thursdays, which will include homework. The first activity will be on Sep 1. Please see activity group assignment on the D2L website. It is our policy that students will work together with one other person during the Thursday activities, i.e. no more than two people (three for certain activities) working together. At the end of the activity/lab hand in only one set of answers and put both of your names and sign on the report cover page. You will both receive the same grade. Note that This policy does **not** apply to *Mastering Astronomy* assignments. The lowest grade of the activities will be dropped, therefore only top 4 activities will be counted. There will be no make up activity, since you can drop one activity grade.

**HOMEWORK ASSIGNMENTS:** Homework assignments will be assigned from the *Mastering Astronomy*. You should not work with someone else for the homework assignments. The assignments should be done by yourself. **NO LATE HOMEWORK** will be accepted.

**WRITING ASSIGNMENTS:** Throughout the semester, you will be required to write 2 essays based on news stories or other topics involving astronomy and space science. Each essay will be at least 3-5 pages long (more than 1000 words per essay). The essays will be submitted only to the D2L turnitin.com. We will hand out detailed instructions later in class and in D2L. You will receive feedback on one of these essays. In addition, exceptional essays will receive bonus points.

**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. Kim.

**POP-QUIZZES:** We will not take attendance every class. However, we will have six UN-announced in-class quizzes spread over the semester. These will be simple questions about important points covered in the class. We will drop your lowest score on the quizzes, 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!

**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 breaks, compute breaks, 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 re-submit an assignment to us (to D2L Dropbox) any time before the deadline.

**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, so if you forget to bring yours, please let Dr. Kim or Mr. Ashoormaram or Mr. Spilker know).

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

- No eating food or drinking (other than water) in the classroom
- Cell phones must be turned OFF and out of sight. If violated, you will be asked to leave from the classroom. If you are expecting an emergency call come and inform Dr. Kim or TA before the lecture/activity. You may go out to pick up the phone and come back to the lecture room. No texting is allowed during the class/activity. You will be asked to leave the classroom if you are using the phone/mobile devices or surfing the web.
- Laptops and tablets may be used for note taking ONLY. Other activities that distract you from the course will not be tolerated. If violated, you will be asked to leave from the classroom.
- Late arrivals and departures are strongly discouraged. If you have a valid excuse for late arrival, discuss the problem with Dr. Kim.

**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 linked from the D2L. So make sure you receive emails sent to your D2L email address. Since all assignments and announcements will be made both in class and on the D2L website, we do not accept "I didn't see the announcement" as an excuse for missing or late assignment, activity, or exam. When you send me or TAs an email, please write your name and questions clearly using full sentences, and do not forget to write your name.

**HONORS CREDIT:** Honors students may choose to work on an extra project with Dr. Kim related to the course topics. Please talk with Dr. Kim to discuss the project for honors credit. Honors contract information is available at <http://www.honors.arizona.edu/future-students/honors-credit-across-campus>.

**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.

**CLASSROOM BEHAVIOR POLICY:** To foster a positive learning environment, students and instructors have a shared responsibility. We want a safe, welcoming, and inclusive environment where all of us feel comfortable with each other and where we can challenge ourselves to succeed. To that end, our focus is on the tasks at hand and not on extraneous activities (e.g., texting, chatting, reading a newspaper, making phone calls, web surfing, etc.). Students are asked to refrain from disruptive conversations with people sitting around them during lecture. Students observed engaging in disruptive activity will be asked to cease this behavior. Those who continue to disrupt the class will be asked to leave lecture or discussion and may be reported to the Dean of Students. Some learning styles are best served by using personal electronics, such as laptops and iPads. These devices can be distracting to other learners. The use of personal electronics such as laptops, iPads, and other such mobile devices is distracting to the other students and the instructor. Their use can degrade the learning environment. Therefore, students are not permitted to use these devices during the class period.

**THREATENING BEHAVIOR POLICY:** The UA Threatening Behavior by Students Policy prohibits threats of physical harm to any member of the University community, including to oneself. See <http://policy.arizona.edu/education-and-student-affairs/threatening-behavior-students>.

**CODE OF ACADEMIC INTEGRITY:** Students are encouraged to share intellectual views and discuss freely the principles and applications of course materials. However, graded work/exercises must be the product of independent effort unless otherwise instructed. Students are expected to adhere to the UA Code of Academic Integrity as described in the UA General Catalog. See:

<http://deanofstudents.arizona.edu/academic-integrity/students/academic-integrity>.

The University Libraries have some excellent tips for avoiding plagiarism, available at

<http://www.library.arizona.edu/help/tutorials/plagiarism/index.html>.

*Selling class notes and/or other course materials to other students or to a third party for resale is not permitted without the instructor's express written consent.* Violations to this and other course rules are subject to the Code of Academic Integrity and may result in course sanctions. Additionally, students who use D2L or UA e-mail to sell or buy these copyrighted materials are subject to Code of Conduct Violations for misuse of student e-mail addresses. This conduct may also constitute copyright infringement.

**UA NONDISCRIMINATION AND ANTI-HARRASSMENT POLICY:** The University is committed to creating and maintaining an environment free of discrimination; see <http://policy.arizona.edu/human-resources/nondiscrimination-and-anti-harassment-policy>

Our classroom is a place where everyone is encouraged to express well-formed opinions and their reasons for those opinions. We also want to create a tolerant and open environment where such opinions can be expressed without resorting to bullying or discrimination of others.

**ADDITIONAL RESOURCES FOR STUDENTS:** UA Academic policies and procedures are available at <http://catalog.arizona.edu/policies> Student Assistance and Advocacy information is available at <http://deanofstudents.arizona.edu/student-assistance/students/student-assistance>

**CONFIDENTIALITY OF STUDENT RECORDS:**

<http://www.registrar.arizona.edu/personal-information/family-educational-rights-and-privacy-act-1974-ferpa?topic=ferpa>

**ACCESSIBILITY AND ACCOMODATIONS:** Our goal in this classroom is that learning experiences be as accessible as possible. If you anticipate or experience physical or academic barriers based on disability, please let Dr. Kim know immediately so that we can discuss options. You are also welcome to contact the Disability Resource Center (520-621-3268) to establish reasonable accommodations. For additional information on the Disability Resource Center and reasonable accommodations, please visit <http://drc.arizona.edu>.

If you have reasonable accommodations, please plan to meet with me by appointment or during office hours to discuss accommodations and how my course requirements and activities may impact your ability to fully participate.

Please be aware that the accessible table and chairs in this room should remain available for students who find that standard classroom seating is not usable.

**SUBJECT TO CHANGE STATEMENT:** Information contained in this course syllabus, other than the grade and absence policy, may be subject to change with advance notice, as deemed appropriate by the instructor. Updated syllabus and materials will be posted in the course D2L.

## LECTURE, ACTIVITY and EXAM SCHEDULE

- 08/23 (Tu) : Lecture 1. Introduction, Syllabus, The Universe, Cosmic Scales (Ch. 1)  
08/25 (Th) : Lecture 2. Night Sky, Patterns in the Sky (2.1) Season (Ch. 2.2), Moon Phase (Ch. 2.3)
- 08/30 (Tu) : Lecture 3. The Science of Astronomy, Copernican Revolution (Ch. 3)  
09/01 (Th) : Mini-lecture 3-1: Nature of Science (3.4) **Activity 1: Nature of Science; MA homework 1 due**
- 09/06 (Tu) : Lecture 4. Motions and Gravity (Ch. 4)  
09/08 (Th) : Lecture 5. Gravity (Ch. 4.2-4.4)
- 09/13 (Tu) : Lecture 6. Light (Ch. 5), Energy and Matter (Ch 5.2-5.4)  
09/15 (Th) : Lecture 7 Energy and Matter Review + **Activity 2. Spectroscopy**
- 09/20 (Tu) : Lecture 8. Telescopes (Ch. 6), Our Planetary System (Ch. 7)  
09/22 (Th) : Lecture 9. Formation of the Solar system, (Ch. 8)
- 09/27 (Tu) : Midterm 1 (at N210)**  
09/29 (Th) : Lecture 10. Planetary Geology, Planetary Atmosphere (Ch. 9, Ch. 10)
- 10/04 (Tu) : Lecture 11. Jovian Planet Systems (Ch. 11), Other members of the Solar System (Ch. 12)  
10/06 (Th) : Lecture 12. Other Planets – Distant World (Ch. 13); **MA homework 2 due**
- 10/11 (Tu) : Lecture 13. The Sun (Ch. 14)  
10/13 (Th): **Activity 3: Solar Lab**
- 10/18 (Tu): Lecture 14. Stars (Ch. 15)  
10/20 (Th) : Lecture 15. H-R Diagram; **MA homework 3 due**
- 10/25 (Tu) : Lecture 16. Star Birth (Ch.16), Star Stuff (Ch.17)  
10/27 (Th) : **ACTIVITY 4. HR Diagram**
- 11/01 (Tu) : Midterm 2 (at N210)**  
11/03 (Th) : Lecture 17. (GL?). Star Death, Black Hole (Ch. 18)
- 11/08 (Tu) : Lecture 18. Our Galaxy (Ch. 19)  
11/10 (Th); Lecture 19. Galaxies, Distance and Age of the Universe (Ch. 20); **MA homework 4 due**
- 11/15 (Tu) : Lecture 20 (GL) Galaxy Evolution, Quasars;  
11/17 (Th) : **ACTIVITY 5. Galaxies**
- 11/22 (Tu) : Lecture 21 (GL?). Big Bang, CMB (Ch. 22) **homework 5 due**  
11/24 (Th) : **Thanksgiving Day, no class**
- 11/29 (Tu): Lecture 22 (GL). Dark Matter, Dark Energy and the Fate of the Universe (Ch. 23)  
12/01 (Th): Lecture 23. Life in the Universe (Ch. 24)
- 12/06 (Tu): Lecture 24. Final Lecture & Summary; **MA homework 6 due**  
**12/13 (Th) : 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 “Register”.
3. Answer “YES, I have an access code.” if you got one with your textbook. (Go to step 5.)
4. Answer “NO” if you must purchase a code on-line.
  - a) Select the textbook at the far left (Bennett et al., The Cosmic Perspective 8e).
  - b) You have the option to purchase MA with the eText (eBook) for \$95.95.  
If you already bought a used book, a Mastering Astronomy account for the **8<sup>TH</sup> edition** alone without the eText will cost \$62.95.
  - c) Continue with instructions to establish your account. Then go to Step 6.
5. Use the access code which is included in your textbook to set up your unique Login ID/Password.
6. Return to the login page and enter the site with your new Login ID and password.
7. During this next stage of registering, there are two additional fields:
  - a) Enter your University of Arizona Net ID number.
  - b) Course ID. Enter the following ID: **MAKIM16B**
  - c) Click the home page link and you are now in the system!

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](mailto:support@masteringastronomy.com) or refer to the online help documents.