

ASTR 201: Cosmology
Spring 2017 – Section 001
Tu/Th 9:30-10:45 am
Dr. Don McCarthy

Syllabus

- I.** Contact and User Information
- II.** Course Overview
- III.** Required Course Materials & Registration
Mastering Astronomy
- IV.** Simple Guidelines to Earn Your “A”
- V.** Requirements
 - Register course materials
 - Your personal “Star name”
 - Daily Skills*
 - Daily homework
 - Daily quizzes
 - Exams
 - Academic Integrity and teamwork policy
- VI.** Getting Help
 - Office hours
 - Study sessions
 - Tutoring
 - Preceptors
 - Lecture recordings
 - Preparing for exams
- VII.** Course Policies
 - Absences, holidays, behavior, accommodations
- VIII.** Grading
 - Course grade
 - “TBD” grades
 - Resurrection Points*
 - Extra-credit
 - Optional project

I. Contact and User Information

Professor Dr. Don McCarthy
Email: dmccarthy@as.arizona.edu
Phone: (520) 621-4079
Twitter: @stellarDon
Office: Steward Observatory, room N404. Take the main elevator up to the fourth floor and walk straight ahead.
Office hours: Tuesday 12-2 pm; Wednesday 2-4 pm (Bookstore #304A); and by appointment
Availability: **any** time. Please (!) do not hesitate to contact me.

Grad Teaching Asst. Ms. Yun-Hsin Huang
Email: yunshsin@email.arizona.edu
Phone: (520) 621-2494
Office: Steward Observatory 302
Availability: to be determined

Preceptors Please volunteer if interested!

Links, Settings, Times

For reminders via texts: Send @astr201 to 81010 or to (520) 441-3714
Class Web site: <http://zeus.as.arizona.edu/~dmccarthy/ASTR201/index.html>
Mastering Astronomy: available through the “Pearson” link on our [D2L](#) site
Lecture recordings: Available on our [D2L](#) site under the “Content” tab
Study session: 2-4 pm (Bookstore conference room #304A)
ThinkTank: To be determined
Rooftop observing: Thursdays from sunset to ~8:30 pm

Information contained in this course syllabus, other than the grading and course policies, may be subject to change with advance notice, as deemed appropriate by Dr. McCarthy.

II. Course Overview

ASTR 201 is a three credit, general education course at the Tier II level intended for students with prior university background in science and mathematics at the Tier I level. Students wishing to contract this course for Honors Credit should contact Dr. McCarthy. Our course focuses on understanding (not memorizing) the physical processes at work in the Universe and on building an awareness of how science influences daily life. We will also use the subject of astronomy to improve skills with numbers, in communication (written and oral), and in problem solving.

Location: Tu/Th, 9:30-10:45 am in room 150 of the Integrated Learning Center (ILC). There may be occasional exceptions to be announced beforehand in class and on our Web site. Lectures will begin promptly at 9:30 am. If you arrive late, please enter quietly from any of the three western entrances but feel free to come up front for a good seat. Food and drinks are not allowed in the auditorium.

Web sites: The site listed above is the focal point for the course. All course materials are posted there and available for downloading. Our class has a minor presence on the University’s D2L site for accessing lecture recordings and *Mastering Astronomy* (via the Content tab).

Students are expected to ...:

1. attend every class.
2. come to class prepared to contribute by completing the required daily assignments.
3. always write clearly using good English grammar.
4. Avoid using phones and electronic devices except in emergencies and for note taking.

Foreign Students: This course aims to help you to improve proficiency in English writing and speech. You are strongly encouraged to work with American students and the leaders of this course, both during and outside of, class. Also, the Center for English as a Second Language ([CESL](#)) provides opportunities, both day and night, to help you improve your writing skills, oral communication, and grammar. They also offer tutoring opportunities. The *Daily Skills* on our Web site will also help you improve.

Content: Classes will emphasize hands-on measurement and observational skills. This “follow the evidence” approach will help develop problem-solving skills and reinforce understanding of the scientific method. Reading assignments will be posted before class. Lectures will supplement and expand upon the required reading using PowerPoint, digital animations, videos, music, laboratory equipment, and liquid nitrogen as teaching tools.

III. Required Course Materials and Registration

Two items are required for this course. Used books and other editions are acceptable.

Item #1. The first book is "*A Briefer History of Time*" (ISBN 9780553385465) written by Stephen Hawking and Leonard Mlodinow. Stephen Hawking is a famous scientist working to understand the Universe and black holes. Since 1988, his books have been best-sellers. Used copies are available in the University's Bookstore and also from amazon.com (\$5-18).

Item #2. Your bursar account will be directly billed (\$60.95) for an “access code” to the interactive Web site called "*Mastering Astronomy*." Although this online learning tool is associated with a textbook [*The Cosmic Perspective* (8th edition)], we will not use the book itself. The billing will be finalized January 24, unless you “opt out” either (a) because you purchased an Access Code for another course within the last year or (b) because you drop the course before then.

IV. Simple Guidelines to Earn Your “A”

To be most successful, each student should set a personal goal of achievement and

1. Read directions carefully.
2. Think about material instead of just memorizing it.
3. Attend every class.
4. Start homework early by reading each assignment as soon as it is posted. Your mind will then be prepared to pickup on hints and examples presented in class.
5. Apply each of the *Daily Skills* (numerical and communication) as they accumulate.
6. Proofread your work carefully to avoid careless errors.
7. Ask questions!
8. Seek help whenever needed by asking questions in class, attending office hours and study sessions, or by making an appointment.

V. Requirements

Your personal Star Name

On the first day of class you will be assigned a star name as your code name for all assignments, exams, projects, and for posting of grades. **To protect your privacy, never write your personal name or student ID number on any assignments in this course. Use your star name instead.**

Daily Skills

Each class will emphasize a basic “*Daily Skill*” in communication and numerical thinking. These skills must be mastered quickly and will accumulate during the course. Students are expected to write clear sentences and paragraphs using good English grammar for all assignments and exams. Both sets of *Daily Skills* are located in the Content section of our Web site.

Homework assignments are a major component (30%) of this course and will emphasize skills in numeracy and writing. In a typical week, written homework will be submitted at the start of Thursday’s class and will be preceded with essential background work on Tuesdays. Homework is designed to involve each student in wrestling with the concepts presented in lectures and the textbook. These assignments will reinforce and apply concepts discussed in class and will improve your capabilities with numbers and writing throughout the semester using the “*Daily Skills*.”

You must adhere to the policies about Academic Integrity and about Teamwork in Section VII!

Occasional “Reaction Paper” essays are meant to engage you in specific topics and to enable you to express your opinions and interpretations in a coherent process once you understand the particular concept. These essays will be graded according to the rubric used in the Writing Program of the Dept. of English: Content (50%), Organization (20%), Expression (20%), Mechanics (10%).

The following **rules** apply to homework assignments:

1. You must adhere to each of the “*Daily Skills*” (numerical and communication) as they accumulate each day of our course.
2. Electronic submissions are not accepted.
3. All homework must be typewritten and stapled. Math symbols and calculations may be handwritten but must be legible.
4. Homework is due at the start of class on the specified date. If an assignment is turned in late, a **late-penalty** of 15% will be assessed for each class period that has elapsed since the due date. Assignments will not be accepted after two subsequent classes.
5. You must always **SHOW** or explain **HOW** you reached a solution by recording intermediate steps in a calculation or describing your solution logically in words. Simply listing an answer is not acceptable and will not receive any points.
6. Some problems require your opinion to be clearly stated. In these cases, your grade will be determined more by your reasoning and writing abilities than by the exact answer.
7. You may **START** an assignment in a team. However, after deciding **HOW** to approach a problem, **you must then make all your own measurements, graphs, and tables and always use your own wording to interpret and express conclusions.** Homework solutions that appear identical are a violation of the Code of Academic Integrity and will receive a grade of zero plus potential expulsion from the course.

Daily written quizzes will be given to promote understanding, self-assessment, attention, participation, and teamwork. Quizzes consist of several questions spread throughout each class.

Exams

There will be two in-class exams (Feb. 16, Mar. 30, and a final exam (May 9, 8-10 am). The two-hour final exam will emphasize the last third of the course. The last two exams will provide "*Resurrection Points*" for students to earn back points lost in previous exams. There will be NO makeup exams except in cases of extreme difficulty such as a proven illness.

All exams will feature a scratch-test format that allows you to continue answering a question until you answer correctly. The number of points awarded decreases with each attempt. Typically this format improves your grade by 10%, i.e., a full letter-grade. Most questions will be multiple-choice but each exam will include at least one short-answer essay question.

ALL exams will be CLOSED-BOOK and CLOSED-NOTES. You may bring a handwritten, double-sided page of notes ("crib sheet") to consult during the exam. Exams will emphasize understanding instead of memorization. Bring your UofA CAT Card, a #2 pencil, and a "scratcher" (penny, paper clip, etc.) to all exams!

VI. Getting Help

Office hours: As listed in Section I. Feel free to suggest other times!

Study session: Dr. McCarthy will lead an optional homework study session each Wednesday afternoon from 2-4 pm in the University's Bookstore, room #304A on the north side of the second floor in the Student Union. Students are welcome to attend and work with each other and with the instructors. To receive help from the instructors on any problem, you must already have attempted that problem. Students will be asked to help each other and to lead discussion.

Tutoring: The "Think Tank" offers tutoring for astronomy. Location and time will be announced.

Preceptors are highly motivated students who wish to help teach their peers under the supervision of the course instructor. Often students learn best from other students and preceptors can really "make a difference." As a preceptor in this course you would take an active role in the teaching process by working directly with Dr. McCarthy. You would also receive University credit by enrolling in LASC 197a (<http://teachingteams.arizona.edu/?q=preceptor/howto>) and completing several workshop sessions with other University preceptors to learn and practice skills in effective teaching. If you would like to become a preceptor, please contact Dr. McCarthy and also learn about the Teaching Teams Program (<http://teachingteams.arizona.edu/>).

Lecture recordings of each lecture can be accessed from our [D2L](#) site under the Content tab. These recordings consist of audio plus video of the main screen but not of any demonstrations.

Preparing for exams: Interactive review sessions will be held one or more days ahead of each exam to provide an opportunity to ask questions and to practice concepts presented during the course. A study guide and sample questions will be posted to help you prepare for exams.

VII. Course Policies

Absences: 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.

You are required to attend each class in accordance with the following University policies:

1. Class Attendance, Participation, and Administrative Drops:
<http://catalog.arizona.edu/policy/class-attendance-participation-and-administrative-drop>
2. Absences for any sincerely held religious belief, observance or practice will be accommodated where reasonable:
<http://policy.arizona.edu/human-resources/religious-accommodation-policy>.
3. Absences pre-approved by the UA Dean of Students (or Dean Designee) will be honored.
<https://deanofstudents.arizona.edu/absences>

Academic Integrity

Dr. McCarthy adheres to the University's 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 Dean of Students' Web site (<http://deanofstudents.arizona.edu/academicintegrity>). It is expected that each student will do his/her own work on all exams, homework, labs, and projects.

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.

During his years of teaching, Dr. McCarthy has developed skills in recognizing plagiarism and outright cheating. Such violations of the Code can be penalized by expulsion from the University and negative reports in your official records. **If you are having difficulty in this course, PLEASE just ask for help instead of sacrificing your future.**

The University Libraries have some excellent tips for avoiding plagiarism:

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

Behavior: Dr. McCarthy promises to be respectful of all students. He hopes you will do the same as stated in the Student Code of Conduct and the following University policies about disruptive and threatening behavior. The UA Threatening Behavior by Students Policy prohibits threats of physical harm to any member of the University community, including to oneself.

<http://deanofstudents.arizona.edu/policiesandcodes/studentcodeofconduct>

<http://policy.arizona.edu/education-and-student-affairs/disruptive-behavior-instructional-setting>

<http://policy.arizona.edu/education-and-student-affairs/threatening-behavior-students>.

Holidays: All holidays <http://www.registrar.arizona.edu/calendar-religious-holidays> observed by organized religions will be honored for those students who show affiliation with that particular religion.

Nondiscrimination and Anti-harrassment:

Dr. McCarthy is committed to creating and maintaining an environment free of discrimination as described in the University's policy at the link posted below. Our classroom is a place where

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

<http://policy.arizona.edu/human-resources/nondiscrimination-and-anti-harassment-policy>

Special accommodations: 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 me 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 Dr. McCarthy 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.

Teamwork Policy: You may **start** an assignment in a team. However, once you decide HOW to approach a problem, **you must then make all your own measurements and use your own wording** to interpret and express conclusions. Any assignments that appear identical will be awarded "zero" points and can lead to expulsion from the class and the University. At a minimum, such violations of the Code will lead to an Academic Integrity investigation with the Dean of Students Office.

VIII. Grading

Course Grade: Students have two options for calculating their semester grade. Grades will be derived from the following categories with the indicated percentage weights.

OPTION #1 (Default):

Daily homework (30%)

Three exams, including the final exam (30%)

Mastering Astronomy (20%)

Participation: Quizzes, "clicker" questions, office hours, study sessions, etc. (20%)

OPTION #2 (Negotiable by February 21):

Optional project (see section below) to be approved by Dr. McCarthy, counting 15%. You may negotiate the percentage of homework and exams. For example:

Daily homework (25%)

Three exams, including the final exam (25%)

Mastering Astronomy (15%)

Participation: Quizzes, "wireless" questions, office hours, study sessions, etc. (20%)

"Participation" includes attending class regularly, completing assignments, in-class quizzes, asking relevant questions during class, seeking help during study sessions and office hours, helping to lead discussions, etc.

Final course grades will be assigned as follows: A (90-100%); B (80-89%); C (70-79%); D (60-69%); E (<60%). Borderline grades, such as B+ ($\geq 87\%$), will be rounded to the next letter grade only if the student completed extra-credit work as discussed below.

“TBD” Grades: Sometimes students misread a question, or get started in the wrong direction, or make a simple mistake that leads to the wrong conclusion. Such assignments will receive a “TBD” grade (i.e., to be determined), allowing you to get back on track to earn a 100% score if you meet with Dr. McCarthy or Ms. Wilson within one week to discuss your work and arrange to improve it.

“Resurrection Points”: We encourage long-term learning throughout the semester. Even if you perform poorly on Exam #1 or #2, you can “resurrect” points lost by demonstrating correct understanding of the same concepts on the next exam(s). Therefore, you can earn a 100% grade on the exam component of this course until the very last moment of the semester.

Extra-credit: Excellent work on two extra-credit activities can increment your semester grade by as much as one-half a letter grade. For example, a B+ (87-89%) will become an A; however, <87% will still be registered as B. No extra-credit activities will be accepted after May 2. A maximum of two extra-credit activities is allowed, but you are welcome to undertake more! Extra-credit may be obtained by participating in activities such as public lectures, observing projects, field trips, etc. A description of such opportunities is posted on the left-hand side of our class Web site.

Optional Project: Each student may undertake a substantial project that will comprise 15% of the final grade. The project can take many different forms and must be approved in advance by Dr. McCarthy by February 7 and summarized in a brief proposal. Three main projects have been popular:

Project #1: Observing sessions where you keep a detailed journal charting the motions of the Sun, Moon, planets, and stars under the guidance of Dr. McCarthy on Thursday evenings. You will observe and record these objects using naked-eye and telescope observations spread throughout the semester. You will also build and operate simple tools for making these measurements: Planispheres, astrolabes, telescopes, etc.,

Project #2: Build your own crystal radio to help understand electromagnetic fields. As part of small groups of students, you will work for one hour per week personally with Dr. McCarthy to build your own radio that operates only by the energy of light itself (i.e., no batteries or power source). You will have fun using electronic techniques and instruments. This project is funded by the Dean of Students through the Student-Faculty Interaction program:

<http://www.studentaffairs.arizona.edu/faculty/grants/> .

Project #3: Formal dinner debates on sometimes controversial science- and policy-related topics. Dinner will be provided through the Student-Faculty Interaction program. One example topic out of many possibilities is the following: *“To understand how the Universe formed and how we evolved from it, we need to look back into the past by studying the most distant stars and galaxies. Astronomers have invested in large telescopes to detect such faint objects. However, human-caused light pollution increasingly brightens the skies and reduces the effectiveness of our observatories. Should the government protect dark skies as a natural resource?”*

Additional options might include very specific reports on astronomical topics, hands-on projects, and special opportunities for interviews (e.g., Vatican Observatory; NASA Projects, etc.). Possible opportunities will be discussed in class. We prefer you choose a project of benefit to you - either because it has interested you for a long time or because it relates to your talents and future career (engineering, business, art, poetry, teaching, journalism, etc.). Each project will be based on research and reading beyond the level of a textbook, encyclopedia, or simple Internet pages.

On or before February 7, you must discuss your ideas with Dr. McCarthy, submit the following items, and receive approval:

1. A suggested title
2. A 100 word typewritten abstract about your project's goals and what you will accomplish.

A four page rough draft will be due at the beginning of class on April 4. Editorial comments will be returned to you and you are expected to follow these suggestions to improve your final version. The completed project is due at the beginning of class on May 2.