

ASTR 201: Cosmology

Spring 2018 – Section 001

Tu/Th 9:30-10:45 am

Dr. Don McCarthy

Syllabus

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I. Contact and User Information

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

Links, Settings, Times

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|---------------------------------|---|
| <u>For reminders via texts:</u> | Send @astr201 to 81010 or to (520) 441-3714 |
| <u>Class Web site:</u> | http://zeus.as.arizona.edu/~dmccarthy/ASTR201/index.html |
| <u>Free online textbook:</u> | https://openstax.org/details/astronomy |
| <u>Lecture recordings:</u> | Available on our D2L site under the “Content” tab |
| <u>Study session:</u> | Wednesdays from 2-4 pm (SUMC Bookstore room #304A) |
| <u>ThinkTank:</u> | To be determined |
| <u>Nighttime observing:</u> | On announced Thursdays from sunset to ~8:30 pm |

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 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. The University’s expected Learning Outcomes are summarized here: <http://gened.arizona.edu/content/tier-one-outcomes#Nats>.

Location: Tu/Th, 9:30-10:45 am in room 141 of the Integrated Learning Center (ILC). Lectures will begin promptly at 9:30 am. If you arrive late, please enter quietly from either of the two entrances but feel free to come up front for a good seat. Food and drinks are not allowed.

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 (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. Be attentive at all times and avoid using phones.

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 978-0-553-38546-5) 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 should be available in the University's Bookstore and also via amazon.com (\$5-18).

Item #2. The second book is "*Cosmology for the Curious*" (ISBN 978-3-319-57039-9) written by D. Perlow and A. Vilenkin. This book is also available as an eBook (ISBN 978-3-319-57040-2).

Optional: A textbook about general astronomy is available for free online, in Web view and PDF format from <https://openstax.org/details/astronomy>. You can also purchase a print version, if you prefer, via [OpenStax](#) on [Amazon.com](#).

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 Messier 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 Messier 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 during classes and the textbooks. 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 should 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 earn 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 Responses and Feedback will be graded and count towards your attendance grade. Your written responses will promote and assess understanding, self-assessment, attention, participation, and teamwork. Quizzes will consist of several questions spread throughout each class.

Exams

There will be two in-class exams (Feb. 15, Mar. 29, and a final exam (May 8, 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.).

Here are links to the University's Final Exam Regulations and Schedule:

<https://www.registrar.arizona.edu/courses/spring-2018?audience=students&cat1=10&cat2=31>

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 class 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

Academic Integrity

Dr. McCarthy and the Department of Astronomy adhere to the University's Code of Academic Integrity. The Dean of Students' Web site below describes the Code and resources that are available to you for improving your work. 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. 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.** <http://deanofstudents.arizona.edu/academic-integrity/students/academic-integrity>

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.

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.

Attendance and 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>

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Absences pre-approved by the UA Dean of Students (or Dean Designee) will be honored:

<https://deanofstudents.arizona.edu/absences>

Holidays: All holidays observed by organized religions will be honored for those students who show affiliation with that particular religion. All absences pre-approved by the Dean of Students will also be accepted. <http://www.registrar.arizona.edu/calendar-religious-holidays>

Behavior: 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.).

Dr. McCarthy promises to be respectful of all students. He expects you will do the same as stated in the Student Code of Conduct and other University guidelines concerning disruptive and threatening behavior.

<https://deanofstudents.arizona.edu/student-code-conduct-student-faqs>

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

The University's Threatening Behavior by Students Policy prohibits threats of physical harm to any member of the University community, including to oneself.

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

Special Accommodations: Our goal in this classroom is that learning experiences be as accessible as possible. If you anticipate barriers related to the format or requirements of this course, please meet with me so that we can discuss ways to ensure your full participation in the course. If you determine that disability-related accommodations are necessary, please register with Disability Resources (621-3268; <https://drc.arizona.edu/>) and notify me of your eligibility for reasonable accommodations. We can then plan how best to coordinate your accommodations.

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>

VIII. Grading

Course Grade: Students have two options for calculating their semester grade if you consult with Dr. McCarthy by February 20. Grades will be derived from the following categories with the indicated percentage weights.

OPTION #1 (Default):

Homework assignments (30%)

Three exams, including the final exam (10% each)

In-class work: Written responses, quizzes, collaborative activities, etc. (20%)

Participation (see below): 20%

OPTION #2 (Negotiable by February 20):

You may negotiate with Dr. McCarthy the percentages of homework and exams.

“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.

Honors Credit: Students wishing to contract this course for Honors Credit should email Dr. McCarthy to set up an appointment to discuss the terms of the contact. Information on Honors Contracts can be found at <http://www.honors.arizona.edu/faculty-and-advisors/contracts>.

Incomplete (I) or Withdrawal (W) Grades: Requests must be made in accordance with University policies, which are available as follows:

<http://catalog.arizona.edu/policy/grades-and-grading-system#incomplete>

<http://catalog.arizona.edu/policy/grades-and-grading-system#Withdrawal>

Optional Project: Each student may undertake a substantial project that will comprise as much as 15% of the final grade. The project can take many different forms and must be approved in advance by Dr. McCarthy by February 6, and summarized in a brief proposal.

IX. Subject to Change Statement

Required language: Information contained in the course syllabus, other than the grade and absence policy, may be subject to change with advance notice, as deemed appropriate by the instructor.