

ASTR 196: Astronomical Problem Solving

Fall 2021 – Section 001

Thursdays from 12:30 to 1:45 pm

Syllabus

Let's Work Together!

We all know there's a global pandemic right now and we are all affected in different ways. So, if you tell me, you're having difficulty of any sort, I will easily accept that and find a way to move forward. Similarly, I hope you will be as kind to me. Here's what I can offer in this course:

1. You are never obligated to provide personal information about your health, etc.
2. You are always welcome to talk with me about anything you're going through.
3. If I can't help directly, I will do my best to find someone who can.
4. If you need more help, must miss class, or need more time, just ask and we'll work together.

I. Contact and User Information

Professor Dr. Don McCarthy
Email: mccarhd@email.arizona.edu
Office: Steward Observatory, room N404. Ride the main elevator up to the fourth floor and look straight ahead.
Office hours: Wed. (2-4 pm) and by appointment
Thurs. (2-4 pm) in Union Bookstore 3rd-floor conference room (304A)
Availability: **any** time. Please (!) do not hesitate to contact me.

Links, Settings, Times

Class Web site (D2L): <https://d2l.arizona.edu>
To receive text reminders (Remind.com): Send @astr19 to 81010 or to (520) 441-3714
Free online textbook: <https://openstax.org/details/astronomy>
Lecture recordings: available on our [D2L](#) site under the "Content" tab
Study Session: Thurs. (2-4 pm) in Union Bookstore 3rd-floor conference room, 304A
Nighttime observing: on announced Thursdays between sunset and ~8:30 pm
ATOMM tutoring: Astronomy Tutoring Offered for Majors and Minors
MW (3:30-5 pm; room 208); Th (4-6 pm)
Tuesday (3:30-5 pm) via Zoom:
<http://uaastroclub.org/resources/astronomy/atomm/>

II. Course Overview

ASTR 196 is a weekly, one-unit seminar in problem-solving and critical thinking available to freshmen planning to major in astronomy. It is designed to introduce these students to astrophysics and the types thought processes they will need in order to succeed in their future courses and careers. Based on topics involving astronomical and natural phenomena, this course emphasizes basic reasoning and numerical skills using pre-calculus mathematics. Expected learning outcomes include mastery of techniques for analyzing questions, formulating logical solutions, physical intuition, the scientific method, and the use of numerical techniques, both mental and electronic.

Expected Learning Outcomes:

1. Demonstrate the ability to meaningfully analyze, apply and integrate the principle findings, common applications, current problems, fundamental techniques, and underlying theory of the astronomy discipline.

2. Employ discipline skills related to the observational techniques, instrumentation, computational methods, and software applications used to investigate modern astrophysical phenomena and problems.
3. Develop proficiency with communicating, translating, and interpreting fundamental astronomical concepts and research results in oral and/or written formats.
4. Conduct guided research and/or develop mastery-knowledge of a specific area of the discipline of astronomy.
5. Participate in the scholarly, ethical, and discipline specific practices of the field at an emergent level.

Compliance with COVID-19 mitigation guidelines: Our health and safety remain the University's highest priority. To protect the health of everyone in this class, students are required to follow the University guidelines on COVID-19 mitigation. Please visit www.covid19.arizona.edu.

Expectations: Each student is expected to come prepared for every scheduled class. As a general rule, students should invest ~3 hours per credit unit outside of class on homework assignments (i.e., ~3 hours per week), preferably starting each assignment well ahead of the due date. During class, students should participate actively in problem-solving discussions with their peers. Since each class will build on the previous one, if you miss a class, you can get behind so quickly that it may be very difficult to catch up, and you will also miss important quizzes, discussions, collaborative work, etc. Throughout the semester, students are expected to present logically organized, legible solutions and to write clear sentences and paragraphs using good English grammar.

Email: We will use our official University email addresses for communications. When you email the instructors, be sure to **identify yourself by name** and to **use an appropriate subject line including the term "ASTR 196."** For example: "ASTR 196: Question about lecture". Otherwise, your messages may not be read and a response will be delayed.

Software Requirements: Ability to download and run the following software: Web browser, Microsoft Word, PDF file reader, "Stellarium," and the University's D2L course management system. FREE software is available to students via this link: <https://softwarelicense.arizona.edu/students>

III. "In-person" Classes

Meeting Times and Location: Thursdays from 12:30-1:45 pm in room 404 of the Harvill building. A map is provided in the Content section of our D2L site. Class will begin promptly at 12:30 pm.

Attendance: Our class has an "in-person" modality, so attendance is required in room N210. However, due to the ongoing pandemic

- If you feel sick, or may have been in contact with someone who is infectious, stay home. Except for seeking medical care, avoid contact with others and do not travel.
- Notify Dr. McCarthy if you will be missing a course meeting or an assignment deadline.
- Non-attendance for any reason does **not** guarantee an automatic extension of due date or rescheduling of examinations/assessments.
 - Please communicate and coordinate any request directly with your instructor.
- If you must miss the equivalent of more than one week of class, you should contact the Dean of Students Office DOS-deanofstudents@email.arizona.edu to share documentation about the challenges you are facing.

- Voluntary, free, and convenient [COVID-19 testing](#) is available for students on Main Campus.
- If you test positive for COVID-19, and you are participating in on-campus activities, you must report your results to Campus Health. To learn more about the process for reporting a positive test, visit the [Case Notification Protocol](#).
- COVID-19 vaccine is available for all students at [Campus Health](#).
- Visit the [UArizona COVID-19](#) page for regular updates.

Recordings of each class can be accessed from our [D2L](#) site under the Content tab. These recordings consist of audio plus video of all content during the class session in Panopto format. All recordings are subject to government and university regulations. Therefore, students accessing unauthorized recordings or using them in a manner inconsistent with UArizona values and educational policies are subject to suspension or civil action.

IV. Textbooks

The book entitled “*How to Solve It*” (Polya, 1945) is recommended but not required.

A free, online textbook is available for this class. “*Astronomy*” is available online at the link below and also in Web view and PDF format. You can also purchase a print version via [OpenStax](#) on [Amazon.com](#). The Web view is recommended, and the responsive design works seamlessly on any device. If you buy via Amazon, make sure you use the following link so you get the official OpenStax print version. (Simple printouts sold by third parties on Amazon are not verifiable and not as high-quality.)

<https://openstax.org/details/astronomy>

V. Homework, TBD Grades, Optional Project, and Exams

Weekly homework assignments are a major component (60%) of this course and will emphasize skills in logical thinking, physical intuition, numeracy, writing, and basic astronomy. Students will take turns presenting their solutions during class. The following **rules** apply to all homework assignments:

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

1. All homework must be typewritten and stapled. Math symbols and calculations may be handwritten but must be legible.
2. 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.
3. 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.
4. Some assignments require your opinion to be clearly stated, so your grade will be determined more by your reasoning and writing abilities than by the exact answer.
5. **Teamwork Policy:** 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.

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

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

Optional project: In lieu of the final exam each student may undertake a substantial project that will comprise 20% of the final grade. This project can take many different forms but should involve creative problem-solving work, not a library “research paper.” The topic must be approved in advance by Dr. McCarthy by October 1, and then summarized in a brief proposal.

There will be two exams: A mid-term (October 7) and a final (December 15, from 1-3 pm). You may bring a handwritten, double-sided page of notes (“crib sheet”) to consult during the exam. Exams will emphasize understanding, not memorization. Here are links to the University’s Final Exam Regulations and Schedule:

<https://registrar.arizona.edu/faculty-staff-resources/room-course-scheduling/schedule-classes/final-exams/final-exams-fall-2021>

VI. Grading

Course Grade: The course grade will be calculated from the following categories with the indicated percentage weights.

Weekly homework (60%)

Participation: Attendance, quizzes, office hours, study sessions, etc. (20%)

Final exam or project (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+, will be rounded to the next letter grade only if the student has participated actively throughout the semester.

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>

VII. Getting Help

Office Hours: See Section I for details. Feel free to suggest other times and make appointments!

Study Session: Dr. McCarthy will lead an optional homework study session each Thursday (2-4 pm) Union Bookstore 3rd-floor conference room, 304A. 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 may be asked to help each other and to lead discussion.

ATOMM (Astronomy Tutoring for Majors and Minors):

Mr. Yujin Qin

"In-person" in room 208 for drop-ins [MW from 3:30-5 pm]

Mr. Gabriele Bozzola

ZOOM [Tu 3:30-6 pm]: arizona.zoom.us/my/bozzola

"In-person" in room 208 for drop-ins [Th 5-6 pm]

Academic Advising: If you have questions about your academic progress this semester, or your chosen degree program, please note that advisors at the [Advising Resource Center](#) can guide you toward university resources to help you succeed.

Life Challenges: If you are experiencing unexpected barriers to your success in your courses, please note the Dean of Students Office is a central support resource for all students and may be helpful. The [Dean of Students Office](#) can be reached at 520-621-2057 or DOS-deanofstudents@email.arizona.edu.

Physical and Mental-health Challenges: If you are facing physical or mental health challenges this semester, please note that [Campus Health](#) provides quality medical and mental health care. For medical appointments, call (520-621-9202. For After Hours care, call (520) 570-7898. For the [Counseling & Psych Services](#) (CAPS) 24/7 hotline, call (520) 621-3334.

Food Insecurity: Any student who has difficulty affording groceries or accessing sufficient food to eat every day, or who lacks a safe and stable place to live and believes this may affect their performance in the course, is urged to contact the Dean of Students for support. In addition, the University of Arizona [Campus Pantry](#) is open for students to receive supplemental groceries at no cost. Please see their Web site (campuspantry.arizona.edu) for open times.

VIII. Course Policies

General: 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>

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/academicintegrity>

The University Libraries have some excellent tips for avoiding plagiarism, available at <https://new.library.arizona.edu/research/citing/plagiarism>.

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: See also Section III above. 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. Notify [Dr. McCarthy](#) if you will be missing an in-person or online class session.

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:

<https://policy.arizona.edu/human-resources/religious-accommodation-policy>

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.

<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.

<https://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, or experience, barriers based on disability or pregnancy, please contact the [Disability Resource Center](#) (520-621-3268) and to establish reasonable accommodations.

Please meet with Dr. McCarthy to discuss your accommodations and how the course's requirements and activities may impact your ability to fully participate.

Nondiscrimination and Anti-harassment: 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>

IX. Subject to Change Statement

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.