

# ASTR 196: Astronomical Problem Solving

Fall 2020 – 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

<b>Professor</b>	Dr. Don McCarthy
<u>Email:</u>	<a href="mailto:dmccarthy@as.arizona.edu">dmccarthy@as.arizona.edu</a>
<u>Office:</u>	Steward Observatory, room N404. Ride the main elevator up to the fourth floor and look straight ahead.
<u>Office hours:</u>	Tues. 2-3 pm and by appointment (also, see Study Session below)
<u>Availability:</u>	<b>any</b> time. Please (!) do not hesitate to contact me.

### Links, Settings, Times

<u>Class Web site:</u>	<a href="https://d2l.arizona.edu/d2l/home/909986">https://d2l.arizona.edu/d2l/home/909986</a>
<u>ATOMM:</u>	Astronomy Tutoring Offered for Majors and Minors Hopefully: Mon through Fri (1-2:30 pm; 3 <sup>rd</sup> floor library in Steward Obs) <a href="http://uaastroclub.org/resources/astronomy/atomm/">http://uaastroclub.org/resources/astronomy/atomm/</a>

<u>To communicate via texts:</u>	Send @astr19 to 81010 or to (520) 441-3714
<u>Class Web site:</u>	<a href="https://d2l.arizona.edu/">https://d2l.arizona.edu/</a>
<u>Free online textbook:</u>	<a href="https://openstax.org/details/astronomy">https://openstax.org/details/astronomy</a>
<u>Lecture recordings:</u>	available on our <a href="#">D2L</a> site under the "Content" tab
<u>Study Session:</u>	Thursdays (2-4 pm)
<u>Nighttime observing:</u>	on announced Thursdays between sunset and ~8:30 pm

### 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.

**Equipment and Software Requirements:** You will need daily access to the following hardware:

1. A computer equipped with microphone (and, if possible, a Web camera);
2. Regular access to reliable Internet signal;
3. Ability to download and run the following software: Web browser, Microsoft Word, PDF file reader. FREE software is available to students via this link:  
<https://softwarelicense.arizona.edu/students>

**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.

### **III. Classes**

**Times:** Thursdays from 12:30-1:45 pm. Class will begin promptly at 12:30 pm. Dr. McCarthy will usually begin the Zoom session ~12 pm, and end ~2 pm, so we can interact informally before, and after, class.

**Locations:** We will be meeting remotely via Zoom until the University notifies us that in-person meetings may commence. Links to access Zoom sessions are part of your “Calendar” on D2L.

When the COVID-19 situation permits teaching on campus, you will be notified via D2L, and we will then meet in room 150 of the Integrated Learning Center (ILC).

If pandemic conditions warrant, the University may require that we return to remote operations. If that is the case, we will notify you by D2L Announcement and by email that we are moving to remote operations.

**Remote / online after Thanksgiving:** After the Thanksgiving holiday, we are scheduled to move to remote teaching via Zoom, exactly as we started the semester.

### **Attendance:**

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 an in-person or online class session.

[Campus Health](#) is testing for COVID-19. Please call (520) 621-9202 before you visit in-person. Visit the [COVID-19](#) page for regular updates.

**Behavior:**

Physical distancing is required in our classroom:

During our in-person class meetings, we will respect CDC guidelines, including restricted seating to increase physical distancing. Any student who does not maintain physical distance from others may be asked to leave the learning space immediately. Noncompliance may result in a Student Code of Conduct complaint being filed with the Dean of Students Office, which may result in sanctions being applied.

Face coverings are required in our classroom:

Per UArizona's [Administrative Directive](#), face coverings that cover the nose, mouth, and chin are required to be worn in all learning spaces at The University of Arizona (e.g., in classrooms, laboratories, and studios). Any student who violates this directive will be asked to leave the learning space immediately and will be allowed to return only when wearing a face covering. Subsequent episodes of noncompliance will result in a Student Code of Conduct complaint being filed with the Dean of Students Office, which may result in sanctions being applied. The student will not be able to return to the learning space until the matter is resolved.

The [Disability Resource Center](#) (DRC) is available to explore [face coverings and accessibility considerations](#) if you believe that your disability or medical condition precludes you from utilizing any face covering or mask option. DRC will explore the range of potential options as well as remote course offerings. Should DRC determine an accommodation to this directive is reasonable, DRC will communicate this accommodation with your instructor.

**Email Communication:** 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.

**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 both Zoom and Panopto formats.

Students will be encouraged, but not required, to enable their video connection. However, students will not be identified by name according to mandated [FERPA Privacy Protections](#).

Students must access content in D2L only. Students may not modify content or re-use content for any purpose other than personal educational reasons. 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 VI!*

1. Electronic submissions are not accepted.
2. All homework must be typewritten and stapled. Math symbols and calculations may be handwritten but must be legible.
3. Homework is due at the start of class on the specified date. If an assignment is turned in late, a **late-penalty** of 20% will be assessed for each class period that has elapsed since the due date. Assignments will not be accepted after two subsequent classes.
4. 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.
5. 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.
6. 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 8) and a final (December 16, 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://www.registrar.arizona.edu/courses/final-examination- regulations-and-information>

<http://www.registrar.arizona.edu/schedules/finals.htm>

## 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, online homework study session each Thursday afternoon from 2-4 pm. 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):**

**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.

**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](mailto: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](http://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.