Astronomy 142: Honors Elementary Astrophysics

Prof. Kelly Douglass

Spring 2026

Astronomy 142 will explore the physics of stars, interstellar gas and dust, galaxies, and the large-scale structure of the universe. We will make use of the physical, mathematical, and astronomical tools you learned (or will be learning this semester) in Physics 121–123/141–143, Math 161–165/171–174, and Astronomy 111.

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Office B&L 425

Office hours Monday 12–1PM, Thursday 1:30–2:30PM, or by appointment *in advance*

TI Julia Largett

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Office POA Library

Office hours Sunday 12–1PM

TI Jay Kneiss

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Office POA Library

Office hours Monday 8–9PM

Website

The course website can be found at http://www.pas.rochester.edu/~kdouglass/Classes/Astr142/; this is the main reference for the course. Here, you can find complete lecture presentations, problem sets, workshop assignments, exams (both practice and real), as well as other helpful resources.

Blackboard

Grades for all assignments and exams will be posted on Blackboard throughout the semester. In addition, any assignments submitted electronically will be done via Blackboard.

Textbooks

There is no required textbook for this class. That being said, here is a list of recommended texts for your reference. They will sometimes be referenced during the lectures. You should not feel compelled to buy any of these; they are all on a two-hour reserve in the Physics-Optics-Astronomy library.

Barbara Ryden & Brad Peterson	*Foundations of Astrophysics*
Frank Shu	*The Physical Universe*
Marc Kutner	*Astronomy: A Physical Perspective*

Lectures

Tuesdays and Thursdays from 11:05AM–12:20PM in B&L 203H, conducted by Prof. Douglass. All the material for each lecture will be available to you on the website. It is strongly encouraged that you take notes on the slides during lecture, so either print these out and bring them with you or have them downloaded on your laptop/tablet with note-taking capabilities.

Recitations

Fridays from 2–4:40PM in B&L 203H, conducted by Jay. Recitations will begin the second week of classes. You are expected to attend one recitation section each week. During the recitations, you will work through example homework problems, learn basic programming skills and how to use Python, work in groups on larger/longer homework questions, coordinate the Observing Project, and review for exams. To successfully complete the weekly programming assignment, please bring a laptop to class.

Observing project

You will have the opportunity to use the 24-inch telescope and advanced, large-format CCD camera with a variety of filters at the Mees Observatory to complete an observing project as part of this course. The observations will require at least one nighttime remote observing session in B&L 203H, starting around sunset. Students will form teams (2–3 people each) to design and conduct the observations; they will remotely operate the telescope and camera themselves under the supervision of the instructor and TIs. Naturally, the schedule for these observations will have to be set based upon the weather and schedules of the team members involved. We will plan for the observations to commence around the beginning of March, after the winter weather has cleared. Observing reports are due on Blackboard by May 10, 2026.

Homework assignments

Problem sets will be due most every week on Tuesday at the beginning of lecture (see schedule), submitted on paper in class. Each problem set will be 2.5% of your final grade; with ten total assignments throughout the semester, this means that your problem sets count for 25% of your final grade for the course.

We strongly encourage you to work together with your fellow classmates on the problem sets. The solutions you submit, however, must be your own thought and expressed in your own words, in accordance with the University's academic honesty policies.

Exams

There will be two midterm exams given throughout the course, given during the normal lecture times on Thursday, February 26$^{\text{th}}$ and April 16$^{\text{th}}$. Each exam will focus on the material covered since the last exam. Each midterm is worth 20% of your final grade for this course. One final exam will be given during the University's final exam week, on Thursday, May 7$^{\text{th}}$ from 7:15–10:15PM. This exam will be cumulative and is worth 20% of your final grade for this course.

You must take all three exams in order to pass the course. If you miss an exam due to illness or emergency, a make-up exam can be scheduled. All make-up exams will be oral examinations of the same duration as the original exam. Oral exams will be administered and graded by Prof. Douglass.

To each exam, you are allowed to bring writing utensils (pencil, pen with blue or black ink), a calculator, and one (two for the final exam) 8.5"×11" sheet of paper on which *you* have written whichever formulas, physical constants, and notes you think you will find helpful for the exam. Computers and graphing calculators into which you can download text or graphics are *not* allowed. The best way to study for an exam is by doing the homework and working through the sample exams on the course website (made available a few days before each exam).

Academic honesty

You are welcome and encouraged to collaborate during recitations, observations, and on the set-up of homework problems. However, all solutions to exams, observation reports, and problem sets must be your own work, written solely by you. According to the UR Academic Honesty Policy, cheating consists of submission of homework or exam solutions that are not your own work, or submissions of solutions under someone else's name. By University rules, any detected act of cheating that is not the result of a simple misunderstanding will be handed over to the Board on Academic Honesty for investigation.

You may **not** use any extra-UR academic-help services, including but not limited to Bartleby, Brainly, Chegg, Course Hero, and Slader. Any access to any of these sites counts as cheating, and thus is also an academic-honesty violation; it would be handed over for investigation by the Board on Academic Honesty.

You may **not** use any large-language-model (LLM) artificial intelligence-like tools, including but not limited to ChatGPT, Gemini/Bard, Copilot, or Titan, either for your assignments or for any purpose involving upload of ASTR 142 material into a LLM. Such use counts as cheating and risks violation of copyright law; infractions would be handed over for investigation by the Board on Academic Honesty and/or the Office of Counsel.

Grading

As outlined above, your grade for this course will be calculated as follows:

Homework	25%
Observing project	15%
Midterm 1	20%
Midterm 2	20%
Final exam	20%

No extra credit assignments will be assigned that are not available to the entire class. Final letter grades will be assigned based on an absolute scale and not by a curve. The grading scale will be as follows:

Percentage score	≥ 80	≥ 75	≥ 70	≥ 65	≥ 60	≥ 55	≥ 50	≥ 45	≥ 35	< 35
Final grade	A	A-	B+	B	B-	C+	C	C-	D	E

Credit hour policy

This course follows the College credit hour policy for four-credit courses. This course meets two times weekly for three academic hours per week. The course also include a workshop that meet for approximately three academic hours per week.

Extra help

Office hours are listed on the course website; if you cannot make the hours, appointments are available. Please come in and see us. We will also answer questions via email and will often be electronically accessible late into the night when problem set due dates and exams approach. We are happy to answer any questions you have concerning the course by either means. Questions from those who find the material confusing enough that they do not know what to ask are most welcome.

Statement of inclusion

The University of Rochester, this course, and its teaching staff are committed to inclusion and welcome students of all backgrounds and abilities. Services and reasonable accommodations are available to students with temporary and permanent disabilities, to students with DACA or undocumented status, to students facing mental health issues, other personal situations, and to students with other kinds of learning needs. Please feel free to let any of us know if there are circumstances affecting your ability to participate in class or your full participation in this course. Some resources that might be of use include:

- Undocumented/DACA Student Support Contacts https://www.rochester.edu/college/ccas/undergraduate/daca/index.html
- University of Rochester CARE network https://www.rochester.edu/care/
- Office of Disability Resources (see below)

Disability resources

The University of Rochester respects and welcomes students of all backgrounds and abilities. In the event that you encounter any barrier(s) to full participation in this course due to the impact of a disability, please contact the Office of Disability Resources. The access coordinators in the Office of Disability Resources can meet with you to discuss the barriers that you are experiencing and explain the eligibility process for establishing academic accommodations. You can reach the Office of Disability Resources at disability@rochester.edu; (585) 276-5075; Taylor Hall; www.rochester.edu/college/disability.

Mental health services

Managing your mental and physical health while keeping up with all the academic responsibilities may be especially challenging, given the ongoing pandemic. The University offers support services in a variety of areas and has adapted to supporting students both in-person and online. We encourage you to review the services offered and reach out should you find yourself struggling. You can find a list of services, with descriptions, at https://www.rochester.edu/college/first-year/guide/support/index.html.

