# ASTR 121 - The Solar System

## Essential Information

- **Instructor Contact Info**
  - **Name & pronouns:** Dr. Andrea Goering (she/her) - call me Andrea or Dr. Goering
  - **Email:** ayocom@uoregon.edu
  - **Office Hours:** Mondays 4-5pm in Price Science Commons B040. Drop in to do homework with peers or ask questions from class! Graduate Teaching Assistant office hours and locations are on page 10.
  - **For a 15-minute one-on-one, book me at:** https://calendly.com/andrea-goering
- **Class Time & Location:** MWF 3:00 pm - 3:50 pm, Willamette 100
- **Final Exam Time & Location:** Tuesday, March 19, 2:45 pm - 4:45 pm, Willamette 100
- **Course Materials**
  - **Textbook:** Astronomy 2e, by Fraknoi, Morrison, Wolff, et al., free online.
  - **Assignments:** Our Canvas Page: https://canvas.uoregon.edu/courses/226097

## Hello and Welcome!

Hello and welcome to ASTR 121! I'm excited for you to join me this term. I grew up in Colorado and studied Engineering Physics at the Colorado School of Mines, where I began my teaching journey as an undergraduate teaching assistant. I came to the UO to pursue a PhD in physics, studying optical materials for solar applications. Along my journey, I found that teaching captured my curiosity more than my projects in the lab. I'm so grateful to teach you one of my favorite topics: astronomy!

## Course Description

ASTR 121 traces our evolving knowledge of the Solar System. We will explore how developments in technology (naked eye observations, telescopes, robotic space probes) have repeatedly changed our understanding about what the Solar System contains and how it formed. We will also move beyond our solar system to see how research on exoplanets (planets around other stars) is reshaping our understanding of what solar systems can look like. You will learn not only about how the scientific process works, but also reflect on how science and technology impact society. Finally, you will reflect on how our knowledge of other worlds can help us to understand and cherish our own.

I do not assume extensive prior knowledge of science or math. We'll teach you to apply the quantitative reasoning you'll need. Your chances of success in this course are high if you ask a lot of questions starting with "why," "how" and "what if" - because curiosity fuels science.

This course is designated as a Natural Science Core Education course. At UO, Core Education is designed to provide a broad, interdisciplinary education that helps students think critically and creatively, communicate clearly, and reflect ethically. In this class, you will practice:

- **Critical Thinking** through In-Class Activities, Homework, and Think & Explain Questions, and
- **Written Communication** through Think & Explain Questions and our Project.

# Course Objectives

By the end of the course, you will be able to…

- **Experience science as a process and a skill:**
  - Formulate questions based on your curiosity, then build and refine your mental models (hypotheses) in an iterative process that mirrors the practice of astronomy.
  - Support arguments and draw conclusions by interpreting data, figures, graphs, and images, and applying physical principles, quantitative reasoning, and logical thinking.
  - Express and reflect upon your mental models during class using various representations (words, images, diagrams, and even gestures) in order to collaborate in knowledge-building with your peers (mirroring how scientists learn as a community).
- **Build an awareness of astronomy as an evolving discipline:**
  - Communicate about astronomy topics in writing or multimedia formats to an audience of your peers, with care taken to center quality sources of evidence and to craft your message according to the context, audience, and purpose of your projects.
  - Hone an awareness of open questions in astronomy, which will help you to better appreciate, analyze, and critique the astronomy you encounter in news media, social media, and popular culture.
- **Build an understanding of Earth as a planet:**
  - Describe how humans “read the sky” and use observational evidence to conclude that the Earth is not at the center of the Solar System.
  - Explain phenomena such as seasons, moon phases, ocean tides, and eclipses.
  - Describe what processes shape Earth’s crust, atmosphere, and climate.
  - Discuss the social, historical, and cultural context and impacts of astronomy.
- **Build an understanding of Solar System Science and Exploration:**
  - Describe the basic characteristics (size, structure, composition, surface features) and motions of objects in the solar system.
  - Compare and contrast solar system objects (planets, moons, rings, and more) to analyze how physical laws and chance encounters guided their development.
  - Describe how the solar system formed and evolved over time.
  - Explain how we find planets around other stars (exoplanets), and summarize the new findings and questions which have arisen from the burst of research in this field.
  - Discuss our place in space and the prospects for life elsewhere in the Universe.

**I’m not a science major. Why should I take an astronomy course?**

I think it’s important for students pursuing a variety of goals to learn astronomy, because:

- Astronomy builds skills employers want, including scientific and quantitative reasoning.
- You will learn strategies for independent learning and study that will serve you well in other classes, and in your journey of lifelong learning.
- Astronomy is part of our history and life. Learning astronomy is inspiring and contributes to a sense of purpose and belonging in our world - a sense of being an “Earthling.”

**Where can I find detailed learning goals that I can use to study?**

- In our study guide, lecture slides, and Canvas assignment descriptions.

# Andrea's Teaching Philosophy

Research shows that people learn best through **active learning**, in which learners are active participants rather than passive observers. Our course design provides structured learning opportunities before, during, and after class to help you engage your brain and monitor your own understanding as you build your knowledge about astronomy.

Each learning opportunity plays a different role, thus they all contribute to your grade, with flexibility built-in and tailored to each mode. If you find that any element of this course design presents a barrier to you or that you would benefit from different types of learning opportunities, please let me know.

# Learning Opportunities and Assessments

**Class Preparation:** You are expected to read the daily textbook sections and watch the recommended videos. While prep is ungraded, class will be most effective for everyone if you are familiar with key terms **before** class. A "shallow" read before class and "deep" read after class can be highly productive.

**In-Class Activities:** We will work together on interactive activities on Canvas during class to guide you through new ideas, so please bring a device. You have unlimited attempts so that you can learn from your mistakes. Due after class, but activities never close, so you can practice with them repeatedly. Focus on understanding and ask lots of questions during class!

**Homework:** Homework will flex your critical thinking skills and guide you to apply new ideas. Homework will be challenging. You will have two attempts and should strive to build understanding as you make mistakes and try again. Please, work together! However, don't just swap answers: you'll learn more if you ask for explanations and explain what you understand to others. I invite you to office hours to find study partners, ask questions, and get some coaching.

Due Mondays at midnight, grace period through Tuesday at noon; deadline is firm because feedback (correct answers and occasional video explainers) will be delivered just after the grace period. I will offer makeup homeworks approximately every two weeks, and your lowest score will be dropped.

**Collaborative Quizzes:** Short quizzes will help you calibrate your understanding. You will have two attempts; only the highest score will count toward your grade. Attempt one is to be done before class, on your own. You will be able to see your score, but **not** which questions you got right or wrong. For attempt two, you will have the chance to discuss your thinking with others in class (this process mirrors the practice of science). We will review quizzes in class immediately after they are due.

Quizzes are open-book and open-note, but you should strive to attempt quizzes **without** these aids to maximize your learning. You have an opportunity to retake quizzes within one week. Retakes will be modified slightly, and you will have only one attempt.

**Think & Explain Questions:**
We will ask you to explain your reasoning on selected topics via a written or video explanation. You may work together to craft your explanations, but the work you submit should be your own (and you should cite any sources you use). About 3 of these will be dropped, out of 8 or 9 total offerings.

**Weekly Reflections:** You'll reflect on your learning, how you're doing overall, and how we conduct the course. This is your chance to give me feedback - use it! Due Mondays at midnight.

**Study Guide:** Our study guide (on Canvas) will include effective study practices, learning goals, and links to weekly study guides, which you can use to guide your reading or to study throughout the term. I will coach you on effective study techniques after our first quiz,

**Project:** You will create two short projects to explore your curiosity and demonstrate your learning expressively. You can work solo, or in groups of 2-4, and will have an opportunity for peer review before grading occurs. Due during weeks 5 and 10. Topics include:

- **Scientist Spotlight:** Learn more about astronomers past and present.
- **AstroBites:** Summarize new research results in astronomy. I will keep a forum open where I will share relevant recent astronomy discoveries relevant to our weekly topics. You're also invited to also post astronomy you find in the news each week! If you're interested in a project analyzing real-life data as an alternative to the AstroBites assignment, let me know by the end of week 5.

**Final Exam:** The final exam covers everything in the course. It will be done individually and proctored in class during our university-scheduled final exam time. If you miss the final due to an emergency or illness, you must request an incomplete grade and schedule a makeup exam next term. Absolutely no early exams will be permitted for any reason. Making travel plans without consulting the final exam schedule does not constitute an emergency. **Please put the final on your calendar now!**

Final exam questions will be in a format similar to homework and quiz questions. You will be expected to apply ideas in some novel (and fun) ways, but mostly the final will test your understanding of core concepts. You should strive to be as prepared as possible for a final exam that asks you to think critically, analyze evidence, and apply your conceptual understanding.

You're allowed an 8.5 x 11 inch reference sheet with information on both front and back sides for the final exam. After each quiz, I will invite you to share your reference sheet for that unit for extra credit.

The final exam weighting has been carefully considered to contribute a meaningful amount to your final grade, but avoiding the unnecessary stress of a truly high-stakes final. The final exam is unlikely to raise or lower your grade by more than a letter grade, but it *is* likely to lower or raise your grade by an amount dependent on how your final exam score compares to your pre-final grade. This can catch students off guard, because if you enter the final with a 90%, you might expect to ace the final as well. However, remember that you have multiple attempts for almost all assignments *except* for the final. So, the best way to earn your goal grade in the class is to engage completely in all learning opportunities, ask lots of questions, and reality-check your understanding of our learning goals regularly throughout the term (strategies for this are described in the study guide).

**Extra Credit**

I offer extra credit opportunities throughout the term. Each one will be worth 0.5%. I will offer more than 4 opportunities, but your total extra credit cannot exceed a total of 2% (though you're welcome to complete additional opportunities just because you find them useful!). I cannot offer individuals any opportunities that I do not offer to everyone, and I will not offer any extra credit after the final exam.

# Time Estimates and Grade Weighting

| Assignment | Frequency & Grading Policy | Due Date | Percent of Grade | Out-of-class time per week |
|---|---|---|---|---|
| Pre-Class Preparation | Daily, ungraded | Before Class | 0% | 2 - 3 hours |
| In-Class Activities | ~ Daily<br>20% dropped | Due after class, but no cutoff date. | 10% | ~ 30 minutes (to review) |
| Homework | ~ Weekly<br><br>2 attempts, plus retakes<br>1 dropped | Due Mondays at midnight.<br><br>Grace period through Tuesday at noon. | 30% | 2 - 3 hours (including office hours) |
| Think & Explain Questions | 5 graded, with revise & resubmit opportunities | Due Mondays at midnight.<br><br>Grace period through Tuesday at noon. | 10% | ~ 20 minutes |
| Weekly Reflections | Weekly, ungraded | Due Mondays midnight. | 0% | ~ 15 minutes |
| Quizzes | Weeks 3, 6, 8, 10<br><br>2 attempts initially, plus retakes | Due on quiz days 15min after class begins. Do 1st attempt before class. Open one class day before due. | 25% | ~ 30 minutes |
| Project | Week 9 | Due Week 9 Monday at midnight. | 5% | < 30 minutes |
| Final Exam | Finals Week | In person during final exam time. | 20% | - |

**Time estimate:** The total out-of-class time is about 8-12 hours per week (the time above, plus about 2-4 hours per week of individual or group study, possibly in the Drop-In Help Center, in Price Science Commons B010). Study wisely: spread out your study time and use the study guide (on Canvas).

**Grade scale:** A: 90%, B: 80%, C: 70%, D: 60%. I use plus/minus: plus for grades ending in 7, 8, or 9 and minus for grades ending in 0, 1, and 2. I round all final grades up to the nearest whole number. Since zero grades are mathematically unfair, I give a grade of 50% for missing work, with the exception of the project and final exam.

**Curving:** I do not curve course grades, because curving can drive an unhealthy competitive culture, while in our classroom, we value collaboration and growth. It is also unnecessary, because I believe each of you is capable of succeeding within this course structure. Sometimes I will curve final grades by a small amount if the final exam questions do not probe your understanding in the way I intended. Historically, this has resulted in about a 1-2% increase on the final grade, but this is not guaranteed.

# Course Policies and Classroom Expectations

**Classroom Expectations for Participation**
This class involves a high level of interaction during class to harness the power of learning together. All students are expected to participate by sharing ideas (even when they might be wrong!) and listening as others share theirs. I understand that our class can spark exciting conversations; however, for the sake of maintaining a quality learning environment for others, please stop your conversations at my signal. I recognize that some students may not be comfortable with interactivity (for instance, neurodivergent students or students who are learning English). I encourage you to find ways to participate in class that are comfortable for you, but also to take risks and expand your comfort zone!

**Respect for Diversity**
You should expect to be welcomed, included, treated with respect, and supported by me and your peers. Students of all racial identities, ethnicities, genders, gender identities, gender expressions, national origins, religious affiliations, sexual orientations, citizenship statuses, ability and other visible and non-visible differences belong in and contribute to this class and this discipline. Please let me know if aspects of the instruction, course design, or class activities and content undermine these principles in any way. To learn about cultivating inclusive experiences, or to voice a concern, check out the Division of Equity and Inclusion and the Center for Multicultural Academic Excellence.

**Communication**
I will communicate with the class through Canvas announcements, Canvas messages, and email. Please make sure to check your Canvas messages and email regularly. I check my own email about twice daily; you can expect a response within one business day. I will send at least one announcement each week to remind you of the week's due dates.

To ask questions about…

- **Course content**: come to office hours! Office hours are **free help sessions** - come ask questions and work together! You can also ask (and answer!) questions on our Course Content Forum. I cannot efficiently answer content questions by email, but can address common themes as they emerge on the forum.
- **Personal concerns**: email me, or book a time to chat privately.
- **Procedural questions about assignments (such as due dates) or course policy**: Please post your question on the FAQ Forum. Someone may have already asked (and answered) it! The goal is to save us all time wasted in email back-and-forth. For instance, if I make a mistake, sometimes I receive (and then must respond to) a flurry of emails; I would much prefer one FAQ Forum post which I can address and follow up with an announcement. Thank you in advance!
- **Technical challenges with Canvas**: contact the UO Service Portal.

I will use Canvas announcements to communicate any course changes made in the event of a campus emergency, inclement weather, or illness/emergencies of my own. Usually, students will be expected to continue coursework as outlined on Canvas. Subscribe to UO Alerts for announcements on campus-wide emergencies or closures.

**Attendance and Absences**
There is no grade penalty for absences; however, attendance is important because we will develop our knowledge through in-class activities and peer interactions during class. A Zoom option will not be offered and class will not be recorded; however, recordings from past years will be offered to everyone in case of illness or just for review. If you do miss class, you are responsible for completing in-class activities, and are encouraged to attend office hours to discuss key ideas and ask questions.

I will ask you to complete daily attendance logs to record whether you were in class or not and to reflect on what you've learned. The logs will provide us both with information on your attendance patterns. You can earn extra credit by reflecting on your attendance twice throughout the term.

**Late Work and Universal Flexibility**
Weekly work in this course is due Mondays at midnight (with the exception of Quizzes, which are due during class time). Activities never close, but the homework grace period ends Tuesday at noon. Grace periods are firm end points, to allow for timely feedback.

Our late work policy is **reason-neutral** (doesn't apply differently based on the reason for work being late) and **automatic** (grace periods are automatically applied and I will drop the lowest activities and homework during week 7 to assist with decisions about withdrawing). I have built flexibility into the course through drops and retakes tailored to each learning opportunity. I hope that this combination of structure and flexibility supports your learning. Unfortunately, I cannot offer additional flexibility. However, you're still welcome to email me if you miss an assignment and are unsure of your next steps. There are exceptions for AEC accommodations and religious observances. If you will miss an assignment due to a religious observance, please send me the observance form by the end of week 2.

**Accessibility Practices**
I strive to enable accessible learning for every student by using Universal Design practices, including:

- **Captioning**:
  - I use presentation software for auto-captioning. It is imperfect, but hopefully helpful.
  - All video content shown during class will be either captioned, or narrated by me.
- **Recording:** Anyone is welcome to record class. Please confirm consent before recording peers.
- **Lengthy Reading:** I will provide the page lengths of reading assignments on Canvas.
- **Slides Prior to Class:** Slides will be provided on Canvas, typically at least 1 day prior to class.
- **Cold Calling:** I will not cold-call students, but I will often invite volunteers to share their thinking.
- **Spelling and Grammar:** There will never be a grade penalty for spelling or grammar errors.
- **Note sheet for exams:** A note sheet will be allowed for everyone (typed or handwritten).
- **Registered accommodations through the Accessible Education Center (AEC):**
  - Flexibility is **not possible for homework**, since correct answers are posted immediately after the grace period. However, the retake option should support your needs.
  - Flexibility **is possible** For Think & Explains and the Project. To request flexibility, please email me as soon as is reasonable (and copy your Access Advisor).
  - In-class writing will never have a time limit, as in-class activities never close.
  - Extended time does not apply to quizzes, since both attempts are untimed.
  - Extended time and reduced distraction environments for the final exam are offered through the AEC. Schedule your exam time by the Friday of week 8.

# University Resources

**One Stop Resources**
A guide to university resources can be found at https://onestop.uoregon.edu/

**Basic Needs**
Being able to meet your basic needs is foundational to your success as a student. If you are having difficulty affording food, don't have a stable, safe place to live, or are struggling to meet another need, visit the UO Basic Needs Resource page (https://blogs.uoregon.edu/basicneeds) for information on support for food, housing, healthcare, childcare, transportation, technology, finances, and legal support.

**Physical Health and Mental Health Resources**
Physical and mental health resources are available through the University Health Center. Students with COVID symptoms should consult UO's COVID-19 Safety Resources, and isolate and rest. I appreciate when students wear a mask when they have a cold, and will do so myself.

Mental health is a critical factor to your overall well being. Students often feel overwhelmed or stressed, experience anxiety or depression, or just need help navigating challenges in their life. It's healthy to seek support. Resources include University Counseling Services and the EMU Duck Nest.

**Technology Access**
You will need to access Canvas during class time. If you do not have access to a suitable device, please look into long-term Technology Checkout for Students or Laptop Checkout at the libraries.

**Tutoring and Academic Engagement**
Learning how to learn is a key theme in our course. The Tutoring and Academic Engagement center offers free tutoring services and resources on healthy learning routines.

**Asking for Help**
You are always welcome to speak with me about challenges you are experiencing inside or outside of the class. If you experience problems causing chronic absences or late work, please let me know so that I can help connect you with resources. I will proactively communicate with you throughout the term if I am worried about you, and may refer you to the Care and Advocacy Program if needed.

**Academic Integrity**
The University Student Conduct Code defines academic misconduct, which includes unauthorized help on assignments and examinations, using sources without acknowledgement, and publishing class materials without permission (on Chegg, for instance). I will report suspected misconduct. Consequences of misconduct can include failure of the relevant assignment, or of the course.

I want you to learn together, and find and cite sources properly! Each assignment will outline whether and how and whether you might work with others so you can clearly act with academic integrity. Info about plagiarism: https://researchguides.uoregon.edu/citing-plagiarism

How we use artificial intelligence (ChatGPT, Bing AI, etc) is changing rapidly. Here's the bottom line:

- These tools are not valid sources of factual information (and are often wrong); do not cite them.
- Don't let AI do your writing (or thinking) for you - develop these skills yourself!
- These tools sometimes generate embarrassingly wrong answers to astro questions.

**Reporting Discrimination, Violence, and Sexual Violence**
I am a mandatory reporter of child abuse and an assisting employee for discrimination or violence reporting. As an Assisting Employee, I will direct students who disclose prohibited discrimination and harassment, including sexual harassment or violence, to resources that can help. I will only report information to the university administration if the student requesting assistance asks me to report (unless someone is in imminent risk of serious harm or a minor).

Students who have experienced sexual assault, relationship violence, sex or gender-based bullying, stalking, and/or sexual harassment may seek resources and help at safe.uoregon.edu or call the 24-7 hotline 541-346-SAFE [7244]. Students experiencing all forms of discrimination or harassment may find support through the Title IX office or the Dean of Students: investigations.uoregon.edu/how-get-support

# Important Academic Policies and Dates

**Incomplete Grades**
Incomplete grade requests can be made if an unexpected situation happens near the end of the term which prevents you from completing a minor but essential course requirement. Requests for an incomplete grade **must be initiated by the student**, and will only be considered for extenuating circumstances after the last day to drop (the end of week 7). Emergencies or illness preventing you from taking the final are the most likely reasons for an incomplete; however, if there is another reason you think qualifies, please email me and we'll figure it out together.

For the purposes of interpreting UO's incomplete policy, satisfactory progress is defined as an overall pre-final exam grade above 60%. If that threshold is not met, you should proactively communicate with me to seek help. I will also reach out directly if I have concerns about your engagement or progress.

**Petitions and Emergency Academic Notification**
While students do have petition options after the term if they were unable to make changes during the term, you should make an effort to address your situation during the term if possible.

If you experience extraordinary circumstances causing extensive lack of engagement, it may be appropriate to engage in the Dean of Students' Emergency Academic Notification process.

**Winter 2023 Dates & Deadlines**
- **Week 1 Saturday:** January 13 is the last day to adjust registration without a 'W'
- **Week 2 Monday:** January 15 is the last day to add a class via DuckWeb.
- **Week 2 Monday:** Martin Luther King, Jr holiday (no class).
- **Week 4:** Midway Student Experience Survey: Open Monday 8:00 am - Friday 6:00 pm
- **Week 7 Sunday:** February 25 is the last day to withdraw or change grade options.
- **Week 8 Friday:** Schedule final exam with AEC to use testing accommodations. I cannot provide a reduced-distraction environment on my own, and cannot guarantee extra time in the lecture hall, so schedule your exam through AEC to use these accommodations.
- **Weeks 9-10:** The End-of-Term Student Experience survey: Open Wednesday, Week 9 at 8:00 am through Monday, Finals Week at 6:00 am
- **Finals week Friday:** March 22, at 5pm, is the last day/time to request an Incomplete.

# Office Hour Schedule

Myself and our GTAs hold office hours for this class during the following times. Physics graduate students also staff the free Drop-In Help Center, PSC B010. That schedule will be shared on Canvas.

Abbreviations: **PSC** is the Price Science Commons. **WIL** is Willamette Hall.

Our GTAs are: Natalie Velez, Fulton McKinney, and Philip Andrago.

| | **Monday** | **Tuesday** | **Wednesday** | **Thursday** | **Friday** |
|---|---|---|---|---|---|
| 9-10 | | | | | |
| 10-11 | Natalie,<br>PSC B010 | | | | |
| 11-12 | Philip, Zoom | | | | Fulton,<br>PSC B010 |
| 12-1 | | | | | |
| 1-2 | | | | | Philip<br>PSC B010 |
| 2-3 | | | | | |
| 3-4 | **Class** | | **Class** | | **Class** |
| 4-5 | Andrea &<br>Natalie,<br>PSC B040 | | Fulton,<br>KLA 171A | | |
| 5-6 | | | | | |

# Weekly Routine

The following routine is just a suggestion. Consider sketching out your own class routine in a planner!

| | **Before Monday** | **Monday** | **Before Wednesday** | **Wednesday** | **Before Friday** | **Friday** |
|---|---|---|---|---|---|---|
| **To Do** | Read for Monday<br><br>Note Homework Questions | **Class & Activity**<br><br>**Office Hours**<br><br>**HW Due** | Read for Wednesday<br><br>Review & Study | **Class & Activity**<br><br>Begin Homework | Read for Friday<br><br>Attempt Quiz | **Class & Activity / Quiz**<br><br>Continue Homework<br><br>**Quiz Due** |

# Course Schedule

| Wk | Monday | Wednesday | Friday |
|---|---|---|---|
| **1**<br>1/8 - 1/12 | **Welcome to ASTR 121!**<br>• **Read:** Syllabus | **Reading the Sky**<br>• **Read** 1.6<br>• **Read** 2.2, 2.4<br>• **Optional:** 2.1, 2.3<br>• **Watch** Intro to Astronomy<br>• **Watch** Scientific Revolution | **Cycles of the Sun**<br>• **Read** 4.1 - 4.4<br>• **Watch** Cycles in the Sky |
| **2**<br>1/15 - 1/19 | **No Class**<br>January 15 (MLK Day) | **Moon Cycles: Phase and Eclipses**<br>• **Read** 4.5, 4.7<br>• **Watch** Moon Phases | **Moon Cycles: Tides**<br>• **Read** 4.6 |
| **3**<br>1/22 - 1/26 | **Planetary Motion**<br>• **Read** 3.1 - 3.4<br>• **Watch** Gravity | **Solar System Origins**<br>• **Read** 7.1 - 7.4<br>• **Watch** Intro to Solar System | **Study Strategies & Metacognition Workshop**<br>**Quiz 1: Weeks 1-2** |
| **4**<br>1/29 - 2/2 | **Planet Earth**<br>• **Read** 8.1 - 8.2, 8.5<br>• **Watch** The Earth | **Earth's Climate**<br>• **Read** 8.3 - 8.4 | **Terrestrial Planet Atmospheres**<br>**Project Introduction** |
| **5**<br>2/5 - 2/9 | **Comparative Planetology**<br>• **Read** CH 9 Thinking Ahead | **The Moon & Mercury**<br>• **Read** 9.1 - 9.3, 9.5<br>• **Watch** Mercury | **Origin of the Moon**<br>• **Read** 9.4<br>• **Watch** The Moon<br>**Quiz 2: Weeks 3-4** |
| **6**<br>2/12 - 2/16 | **Venus**<br>• **Read** 10.1 - 10.3<br>• **Watch** Venus | **Mars**<br>• **Read** 10.4 - 10.5<br>• **Watch** Mars | **Contrasting Worlds**<br>• **Read** 10.6<br>**Grade Example Projects** |
| **7**<br>2/19 - 2/23 | **Giant Planets I**<br>• **Read** 11.1 - 11.2<br>• **Watch** Jupiter | **Giant Planets II**<br>• **Read** 11.3<br>• **Watch** Uranus and Neptune | **Quiz 3: Weeks 5-6**<br>**Project Time and Q&A** |
| **8**<br>2/26 - 3/1 | **Moons of the Outer Worlds**<br>• **Read** 12.1 - 12.3<br>• **Watch** Jupiter's Moons | **Planetary Rings**<br>• **Read** 12.5<br>• **Watch** Saturn<br>**Project Draft Due** | **Project Peer Review** |
| **9**<br>3/4 - 3/8 | **Asteroids & Comets**<br>• **Read** 13.1 - 13.3<br>• **Watch** Asteroids<br>• **Watch** Comets | **KBOs, Pluto & Charon**<br>• **Read** 13.4, 12.4<br>• **Watch** The Oort Cloud<br>**Project Due** | **Meteors**<br>• **Read** 14.1 - 14.2<br>• **Watch** Meteors<br>**Quiz 4: Weeks 7-8** |
| **10**<br>3/11 - 3/15 | **Solar System Formation**<br>• **Read** 14.3, 14.5<br>• **Watch** Why is the Solar System Flat? | **Exoplanets & Life**<br>• **Read** 14.4, CH 30<br>• **Watch** Exoplanets | **Final Review**<br>**Quiz 5: Weeks 9-10** |
| **Final Exam: Tuesday, March 19, 2:45 pm - 4:45 pm** | | | |